

# EXHIBIT 2

1

IN THE UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF NORTH CAROLINA  
SOUTHERN DIVISION

3

-----  
4 IN RE: CAMP LEJEUNE )  
WATER LITIGATION, )  
5 )  
Plaintiff, )  
6 ) No. 7:23-CV-00897  
vs. )  
7 )  
UNITED STATES OF )  
8 AMERICA, )  
9 )  
Defendant. )  
-----

10

11 DEPOSITION OF: R. JEFFREY DAVIS  
12 FEBRUARY 13, 2025  
13 9:13 A.M. TO 5:45 P.M.  
14

15

Location: UNITED STATES ATTORNEY'S OFFICE  
111 South Main Street, Suite 1800  
Salt Lake City, Utah

16

Reporter: Vickie Larsen, CCR/RMR  
Utah License No. 109887-7801  
Nevada License No. 966

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Notary Public in and for the State of Utah

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29                 Deanna Havai  
30                 Tim Thompson  
31                 Zina Bash  
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33                 Norman Jones  
34                 Allison O'Leary  
35                 Kevin Dean

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1 February 13, 2025

9:13 a.m.

2 P R O C E E D I N G S

3 THE VIDEOGRAPHER: Good  
4 morning. We are going on the record  
5 at 9:13 a.m. on February 13, 2025.  
6 This is Media 1 deposition recording  
7 of R. Jeffrey Davis in the matter of  
8 Camp Lejeune Water Litigation filed in  
9 the District Court for the Eastern  
10 District of North Carolina, Case  
11 Number 7:23-CV-00897.

12 This deposition is being held  
13 at the Utah Attorney General's office  
14 in Salt Lake City, Utah. My name is  
15 McKayla Largin. I'm the videographer.  
16 And Vickie Larsen is the court  
17 reporter.

18 Will all counsel state who they  
19 represent for the video record.

20 MS. SILVERSTEIN: Kailey  
21 Silverstein for the United States.

22 MR. ANWAR: Haroon Anwar for  
23 the United States.

24 MR. ANTONUCCI: Giovanni  
25 Antonucci for the United States.

1                   MS. BOLTON: Devin Bolton for  
2 the plaintiffs.

3                   MS. BAUGHMAN: Laura Baughman  
4 for the plaintiffs.

5                   THE VIDEOGRAPHER: Will the  
6 court reporter please swear in the  
7 witness.

8                   R. JEFFREY DAVIS,  
9 called as a witness, having been duly sworn,  
10 was examined and testified as follows:

11                   EXAMINATION

12 BY MS. SILVERSTEIN:

13                   Q.         Good morning, Mr. Davis. My  
14 name is Kailey Silverstein.

15                   THE REPORTER: I can't hear  
16 him.

17                   MS. BOLTON: Kevin Dean for the  
18 plaintiffs.

19                   Q.         BY MS. SILVERSTEIN: My name's  
20 Kailey Silverstein. I'm with the Department  
21 of Justice and we represent the United States  
22 here in this litigation.

23                   Can you please state your full  
24 name.

25                   A.         Richard Jeffrey Davis.

1 Q. And is calling you Mr. Davis  
2 fine?

3 A. Sure.

4 Q. Great.

5 And what's your current  
6 address?

7 A. 447 -- 447 Eastview Drive,  
8 Alpine, Utah 84004.

9 Q. Great.

10 Have you had your deposition  
11 taken before?

12 A. No.

13 Q. All right. I'm going to start  
14 by just going over some of the rules of the  
15 road.

16 A. Sure.

17 Q. The attorneys might have gone  
18 over some of this with you previously, so it  
19 might sound familiar.

20 Do you understand that you are  
21 under oath?

22 A. Yes.

23 Q. And do you understand that this  
24 is a court proceeding, even though we're not  
25 in a courtroom?

1           A.       Yes.

2           Q.       Do you understand that you're  
3       under the penalty of perjury?

4           A.       Yes.

5           Q.       The court reporter is taking  
6       down everything that we say today, so it's  
7       important to do things like answer questions  
8       out loud. I know sometimes in conversation  
9       we're inclined to nod our head or shake our  
10      head. That's hard to get down on the  
11      transcripts. If you could answer all of the  
12      questions verbally, that would be great.

13                  Does that make sense?

14           A.       Yes.

15           Q.       You and I should also do our  
16       best not to interrupt each other. There  
17       might be times today that you anticipate  
18       correctly what question I'm going to ask.  
19       I'll ask that you please let me ask my full  
20       question anyway, and I'll do my best to make  
21       sure that you get your complete answer out  
22       before I ask the next question.

23                  Does that make sense?

24           A.       Yes.

25           Q.       Do you understand that you're

1           the only one testifying today?

2           A.       Yes.

3           Q.       If during this deposition I ask  
4       a question that you don't understand or  
5       doesn't make sense, please let me know and I  
6       will do my best to clarify and make sure  
7       we're on the same page with what I'm asking.  
8       If you answer the question, then I will  
9       assume that you understood what I was asking.

10                  Does that make sense?

11                  A.       Yes.

12                  Q.       You might hear your attorney  
13      object during this objection -- during this  
14      deposition, excuse me. If that's the case,  
15      unless she instructs you not to answer, you  
16      can go ahead and answer the question.

17                  Does that make sense?

18                  A.       Yes.

19                  Q.       We'll take breaks during this  
20      deposition. I usually try and take a break  
21      about every hour. If you need a break before  
22      that, please just let me know and we can --  
23      we can take a break.

24                  The only thing that I'll ask is  
25      that if I've already asked a question that

1       you haven't answered yet, that you'll go  
2       ahead and answer that question before we take  
3       a break.

4                          Does that make sense?

5       A.       Yes.

6       Q.       Okay. I am handing you what I  
7       will mark as Exhibit 1.

8       (Exhibit 1 was marked for identification.)

9       Q.       BY MS. SILVERSTEIN: This is  
10      your notice of deposition and subpoena.

11                         Have you seen these documents  
12      before?

13       A.       Yes.

14       Q.       Do you --

15                         MS. BAUGHMAN: Okay, fine.

16       Q.       BY MS. SILVERSTEIN: My  
17      understanding is that you've been retained by  
18      the plaintiffs to offer an expert opinion in  
19      the In Re: Camp Lejeune Water Litigation; is  
20      that correct?

21       A.       Yes.

22       Q.       When were you hired?

23       A.       I can't remember the exact  
24      date, but it was the end of September.

25       Q.       Okay. And who hired you?

1           A.       This legal team.

2           Q.       When you say "September," is  
3       that September 2024?

4           A.       Yes, September 2024.

5           Q.       When you were hired in  
6       September, was it your understanding that it  
7       was to write a report due in October 2024?

8           A.       Yes, that's correct.

9           Q.       If you could turn to  
10      Attachment A, which is the last -- on the  
11      back side of the second-to-last page and the  
12      last page.

13                  MS. BAUGHMAN: I think his is  
14                  in different order. That's why I was  
15                  looking at it.

16           Q.       BY MS. SILVERSTEIN: Do you see  
17      Attachment A? Try the second. There you go.  
18      Okay. And are you on Attachment A?

19                  The document states "Pursuant  
20      to the Federal Rules of Civil Procedure  
21      30(b)(2) and 45, the United States makes the  
22      following requests for the production of  
23      non-privileged documents, communications, and  
24      materials, including but not limited to, any  
25      electronically stored information, data,

1       technical files, and photographs, within your  
2 possession, custody, or control."

3                          Do you see where I'm reading  
4 that?

5                          A.        Uh-huh.

6                          Q.        It then has as Number 1: "All  
7 emails, letters, correspondence, text  
8 messages, conversations, chats, voicemails,  
9 data, technical files, and other  
10 communications pertaining to Camp Lejeune  
11 sent or received prior to your retention as  
12 an expert in this matter, including but not  
13 limited to, from, or with:

14                          "Morris Maslia, Robert Faye,  
15 Jason Sautner, David Savitz, Rene  
16 Suarez-Soto, Susan Martel, Scott Williams,  
17 Frank Bove, Mike Partain, Jerry Ensminger,  
18 Lori Freshwater."

19                          Do you have any emails,  
20 letters, correspondence, text messages,  
21 conversations, chats, or voicemails from any  
22 of those individuals?

23                          A.        No.

24                          MS. BAUGHMAN: That's prior to  
25 being retained; right?

1                   THE WITNESS: Yeah.

2                   MS. SILVERSTEIN: Correct.

3                   Q.         The document then provides  
4        "All" letters -- "emails, letters,  
5       correspondence, text messages, conversations,  
6       chats, voicemails, or other communications  
7       to, from, or with any individual who has  
8       filed a claim with the Department of the Navy  
9       or Eastern District of North Carolina  
10      pursuant to the Camp Lejeune Justice Act of  
11      2022."

12                  Do you have any of those  
13      communications?

14                  A.         No.

15                  MS. BAUGHMAN: Just for the --  
16       just for the -- just for -- give a  
17       little pause --

18                  THE WITNESS: Okay.

19                  MS. BAUGHMAN: -- before so I  
20      can say something if I want to.

21                  Just for the record, we've  
22      lodged some objections. I don't think  
23      he has any such documents, but I'm not  
24      sure how he's supposed to know who has  
25      filed a claim, which we've objected

1           to. So just for the record, we've  
2           made objection to that.

3                         And now you can answer.

4           Q.           BY MS. SILVERSTEIN: Mr. Davis,  
5           do you have any of those communications with  
6           anyone that's filed a claim pursuant to the  
7           Camp Lejeune Justice Act?

8           A.           No.

9           Q.           And then it says "All bills,  
10          invoices, or other documents reflecting  
11          compensation..."

12                  Do you have -- aside from the  
13          documents that have been produced by the  
14          plaintiffs already, do you have any  
15          additional bills, invoices, or compensation  
16          documents?

17                  MS. BAUGHMAN: He doesn't know  
18          what we produced, so -- I produced the  
19          documents.

20           Q.           BY MS. SILVERSTEIN: Do you  
21          have any -- any documents besides monthly  
22          bills that you've provided to the attorneys?

23           A.           Any additional documents?

24           Q.           Any additional bills, invoices,  
25          or other compensation documents.

1           A.       No.

2           Q.       Before you were retained, had  
3       you heard about Camp Lejeune?

4           A.       Like, that it existed?

5           Q.       Had you heard anything about  
6       Camp Lejeune?

7           A.       I know that it's a military  
8       base.

9           Q.       Okay. Had you heard anything  
10      about the water modeling related to  
11       Camp Lejeune?

12          A.       No.

13          Q.       How did you hear about  
14       Camp Lejeune as a military base before you  
15       were retained?

16          A.       In my career, I've done work  
17       for the Department of Defense, early on in my  
18       career, and so I'm familiar with most of the  
19       military bases here in the country.

20          Q.       Was that work at all related to  
21       the Camp Lejeune --

22          A.       No.

23          Q.       -- military base?

24                   You submitted a joint report  
25       with Dr. Jones.

1                   How are you familiar with him?

2                   A.        I've known him for, I don't  
3                   know, about 35 years. He was my adviser when  
4                   I was a graduate student.

5                   Q.        And have you kept in contact  
6                   with him during -- on and off at least,  
7                   during that entire 30-year span?

8                   A.        Yes.

9                   Q.        Have you and Dr. Jones worked  
10                  together before?

11                  A.        Yes, we worked together before.

12                  Q.        On what kind of work?

13                  A.        Well, we -- we used to work  
14                  together for several years doing training  
15                  courses and software development and -- and  
16                  groundwater modeling consulting.

17                  Q.        Prior to the reports that you  
18                  co-authored in the Camp Lejeune litigation,  
19                  when had you most recently worked with  
20                  Dr. Jones?

21                  A.        Probably 2007 or 2008.

22                  Q.        Does any of your prior work  
23                  with Dr. Jones include work on expert reports  
24                  for litigation?

25                  A.        No.

1           Q.       And you mentioned that you did  
2 work with the Department of Defense.

3                   When did you work with the  
4 Department of Defense?

5           A.       This was mostly in the 1990s.

6           Q.       Okay. And what kind of work  
7 did you do with the Department of Defense?

8           A.       Well, we had a joint contract  
9 with them to develop groundwater modeling  
10 software.

11          Q.       Do you know what -- well, so  
12 what groundwater modeling software did you  
13 work to develop?

14          A.       We developed a package called  
15 the Groundwater Modeling System, GMS.

16          Q.       And do you know what that  
17 was -- what that was used for?

18                   MS. BAUGHMAN: Objection.

19                   Form.

20                   THE WITNESS: To do groundwater  
21 modeling.

22          Q.       BY MS. SILVERSTEIN: Sure.

23                   Do you know any specific  
24 groundwater modeling projects that was used  
25 for?

1 A. By who?

2 Q. By the Department of Defense.

3 A. Yes, I'm quite familiar that  
4 they used it all over their -- their military  
5 installations to do groundwater modeling.

6 Q. Did you work on -- aside from  
7 helping develop the software, did you work on  
8 any of the groundwater modeling projects that  
9 used GMS?

10 A. No.

11 Q. Was the 1990s when you most  
12 recently worked with the Department of  
13 Defense?

14 A. Yes.

15 Q. And what did -- what was your  
16 role in helping develop GMS?

17 A. I oversaw the development. I  
18 had students, graduate students, working for  
19 me.

20 Q. Graduate students from where?

21 A. From Brigham Young University.

22 Q. Were you working for Brigham  
23 Young at the time?

24 A. Yes.

25 Q. What were you doing there?

1           A.       I had a research position.

2           Q.       Who suggested that you and  
3       Dr. Jones co-author the reports for the  
4       Camp Lejeune litigation?

5           A.       That was an agreement by the  
6       two of us, Dr. Jones and myself.

7           Q.       And how did that agreement come  
8       to be?

9           A.       We felt like in order to  
10      produce what was asked by the legal team,  
11      that it would take the resources of both of  
12      us.

13          Q.       Okay. Did Dr. Jones reach out  
14      to you to work on the project or did you  
15      reach out to him?

16          A.       He actually reached out to me  
17      after the legal team had reached out to me.

18          Q.       All these many documents.

19          A.       Fun reading.

20          Q.       I'm handing you Exhibit 2.

21      (Exhibit 2 was marked for identification.)

22          Q.       BY MS. SILVERSTEIN: This is  
23      Exhibit 2. It is titled "Tarawa Terrace Flow  
24      and Transport Model Post-Audit."

25                   Was this report prepared by

1       you?

2           A.       Yes.

3           Q.       Jointly with Norman Jones?

4           A.       Yes.

5           Q.       Is this a fair and accurate  
6 copy of your report?

7           A.       Well, not having gone through  
8 every single page, I'm assuming that it is.

9           Q.       And is it signed on the first  
10 page --

11          A.       Yes.

12          Q.       -- by you?

13                 What was the process for you  
14 and Dr. Jones working together on this  
15 report?

16                 MS. BAUGHMAN: Objection to the  
17 form.

18                 THE WITNESS: I would -- I  
19 guess I'm going to ask how detailed do  
20 you want? What kind of answer do you  
21 want?

22          Q.       BY MS. SILVERSTEIN: Sure.

23                 Kind of a high-level look.  
24                 What -- what kind of process did you and  
25 Dr. Jones have? Like, for example, were you

1 working in tandem and then at the end would  
2 discuss your findings? Were you working on  
3 different pieces? What did that look like?

4 MS. BAUGHMAN: Object to the  
5 form.

6 THE WITNESS: I primarily was  
7 in charge of the model and running the  
8 model and producing the results.

9 MS. SILVERSTEIN: Okay.

10 THE WITNESS: And Dr. Jones and  
11 I would discuss the results. I would  
12 send him the outputs, which he would  
13 create certain graphs and figure --  
14 certain graphs, and then we would  
15 discuss those. And then, you know, in  
16 preparation for the report, my staff  
17 would make the official figures and  
18 tables to go into the report.

19 Q. BY MS. SILVERSTEIN: Okay. Are  
20 all of the opinions that are in this report  
21 yours?

22 A. Yes. Jointly -- jointly ours.

23 Q. Are there any opinions that are  
24 only Dr. Jones' opinions and not yours?

25 A. No.

1           Q.       If I assume that you either  
2       wrote or otherwise approved of every word in  
3       this report; is that -- is that accurate?

4           A.       Yes.

5           Q.       If at any point I ask you about  
6       a statement in this report that you didn't  
7       write or approve of before the report was  
8       finalized and it is Dr. Jones' work, I'll ask  
9       that you please let me know. If you don't,  
10      I'm going to assume that all the statements  
11      are -- are yours; is that fair?

12       A.       Yes.

13       Q.       And if I refer to this report  
14      as your "initial report," will you understand  
15      that I'm talking about the report submitted  
16      on October 25, 2024?

17       A.       Yes.

18       Q.       Okay. I'm handing you  
19      Exhibit 3.

20      (Exhibit 3 was marked for identification.)

21       Q.       BY MS. SILVERSTEIN: Okay.  
22      This is titled "Rebuttal Report Regarding  
23      Tarawa Terrace Flow and Transport Model  
24      Post-Audit."

25                   Was this report prepared by

1       you?

2           A.       Yes.

3           Q.       And is it a fair and accurate  
4       copy of your rebuttal report?

5           A.       This -- again, assuming that  
6       this is complete, yes.

7           Q.       Okay. And my understanding  
8       again is that you and Dr. Jones worked  
9       jointly on this report?

10          A.       Yes.

11          Q.       And it's correct that all of  
12       the opinions in this report are yours?

13          A.       Yes.

14          Q.       And just like with the initial  
15       report, if there's anything that I ask you  
16       about in the rebuttal report that is not  
17       yours, I'll assume that you're -- you'll let  
18       me know that; is that fair?

19          A.       Yes.

20          Q.       And if I refer to the report  
21       submitted on January 14, 2025, as the  
22       "rebuttal report," will you understand what  
23       I'm referring to?

24          A.       Yes.

25          Q.       You mentioned a few minutes ago

1       that you primarily worked on the modeling and  
2       Dr. Jones did the graphs and figures.

3                   Was there any other part of the  
4       reports that Dr. Jones worked on?

5                   MS. BAUGHMAN: Objection.

6                   Form.

7                   THE WITNESS: Besides the  
8       analysis and writing?

9                   Q.       BY MS. SILVERSTEIN: So if  
10      there are pieces of the initial report or  
11      rebuttal report that are describing or  
12      interpreting the model results, would that  
13      have been work performed by Dr. Jones, by  
14      you, or by both of you?

15                  MS. BAUGHMAN: Objection.

16                  Form.

17                  THE WITNESS: Both of us.

18                  Q.       BY MS. SILVERSTEIN: I want to  
19      talk to you about what, if anything, you did  
20      to prepare for this deposition today.

21                  Did you do any kind of  
22      preparation for your deposition?

23                  A.       Yes.

24                  Q.       What did you do?

25                  A.       I read -- I reread our reports

1 and read through other reports from the other  
2 experts.

3 Q. What reports from other experts  
4 did you read?

5 A. I read the rebuttal reports and  
6 reread some of the initial modeling reports  
7 from the initial original model that was  
8 done.

9 Q. When you say you read the  
10 rebuttal reports, are you referring to the  
11 rebuttal reports of Dr. Konikow,  
12 Dr. Sabatini, and Morris Maslia?

13 A. Not Dr. Sabatini's.

14 Q. At any point did you read  
15 Dr. Sabatini's report?

16 A. I might have skimmed through  
17 it.

18 Q. Okay. For -- to prepare for  
19 your deposition, did you review the expert  
20 report from Dr. Aral?

21 A. I might have skimmed through  
22 that.

23 Q. Had you read that report  
24 previous to preparing for this deposition?

25 A. I don't believe so.

1           Q.       To prepare for your deposition,  
2        did you read the reports of  
3        Dr. Spiliotopoulos or Dr. Hennet?

4           A.       Yes.

5           Q.       Had you read those -- had you  
6        reviewed those reports prior to preparing for  
7        the deposition?

8           A.       Not as thoroughly as I read  
9        them, but in preparing our rebuttal report.

10          Q.       Aside from the other expert  
11        reports and your own expert reports, did you  
12        review -- you said that you reviewed ATSDR  
13        reports; is that right?

14          A.       Correct.

15          Q.       Which reports did you review?

16          A.       The Chapter A and Chapter F,  
17        primarily.

18          Q.       And had you reviewed Chapters A  
19        and F prior to writing your own reports?

20          A.       Correct.

21          Q.       And just to clarify, is that  
22        Chapter A and Chapter F for Tarawa Terrace?

23          A.       Correct.

24          Q.       Did you review any other ATSDR  
25        reports to prepare for this deposition?

1           A.        No.

2           Q.        And did you list all of the  
3        materials that you reviewed to prepare your  
4        reports in your materials considered list?

5           A.        Yes.

6           Q.        To prepare for your deposition,  
7        did you speak with or meet with anybody?

8           A.        Yes.

9           Q.        Who did you meet with?

10          A.        The -- our legal team.

11          Q.        Do you remember who  
12        specifically on the legal team?

13          A.        Yes.

14          Q.        And who is that?

15          A.        Specifically Devin and Laura.

16          Q.        Was that meeting -- did you  
17        have one meeting or multiple meetings?

18          A.        One meeting.

19          Q.        Was that in person or via some  
20        sort of tele meeting?

21          A.        In person, in my office,  
22        yesterday.

23          Q.        About how long did that meeting  
24        last?

25          A.        Roughly half the day.

1           Q.       And did you review any  
2 documents during that meeting?

3           A.       Yes.

4           Q.       What documents did you review?

5           A.       Our two original post-audit  
6 report and the rebuttal report.

7           Q.       Did you speak with Dr. Jones  
8 about your deposition?

9           A.       Yes.

10          Q.       When did you speak with  
11 Dr. Jones?

12          A.       Yesterday at the same meeting.

13          Q.       Was he present -- you mean he  
14 was present at that meeting with Laura and  
15 Devin?

16          A.       Yes.

17          Q.       Have you spoken to him any  
18 other time about the deposition?

19          A.       Yes.

20          Q.       When was that?

21          A.       Multiple times over the last  
22 several months.

23          Q.       Aside from Dr. Jones, Laura,  
24 and Devin, was anybody else present at the  
25 meeting that you had yesterday?

1           A.       Part of the meeting was  
2         attended by Kevin.

3           Q.        Okay.  Was anybody else present  
4         for any part of the meeting?

5           A.        No.

6           Q.        Have you reviewed any  
7         depositions that you didn't list in your  
8         materials considered list?

9                   MS. BAUGHMAN: Objection.  
10                  Form.

11                 Can you show him the materials  
12         considered list?

13                 MS. SILVERSTEIN: Yeah. I'll  
14         pull it up in a minute.

15                 Q.       But I -- so Dr. Aral's  
16         deposition took place last week. Did you  
17         review the transcript from Dr. Aral's  
18         deposition?

19                 A.       Yes.

20                 Q.       When did you review that?

21                 A.       Last week.

22                 Q.       Mr. Maslia was deposed in 2024.  
23         Did you review the transcript from that  
24         deposition?

25                 A.       No.

1           Q.        He -- Mr. Maslia was also  
2 deposed related to Camp Lejeune in 2010. Did  
3 you review that deposition?

4           A.        No.

5           Q.        Did you review the deposition  
6 of Dr. Dan Waddill?

7           A.        No.

8           Q.        Did you review the deposition  
9 of Rene Suarez-Soto?

10          A.        No.

11          Q.        Did you review the deposition  
12 of Jason Sautner?

13          A.        No.

14          Q.        Did you review the deposition  
15 of Dr. Frank Bove?

16          A.        No.

17          Q.        Did you review the deposition  
18 of Dr. Christopher Rennix?

19          A.        No.

20          Q.        Did you review the deposition  
21 of Dr. Christopher Ray?

22          A.        No.

23          Q.        And did you review the  
24 deposition of Dr. Susan Martel?

25          A.        No.

1           Q.       And you said earlier that you  
2       have never been deposed before; is that  
3       right?

4           A.       Correct.

5           Q.       Have you ever testified in a  
6       trial before?

7           A.       No.

8           Q.       Have you prepared an expert  
9       report for a court case before?

10          A.       Yes.

11          Q.       About how many times?

12          A.       Twice.

13          Q.       Do you recall how long ago  
14       those were?

15          A.       Yes.

16          Q.       When were they?

17          A.       The first one was in 2022, and  
18       the second one was in 2024.

19          Q.       What kind of cases were  
20       those -- did you prepare the -- the expert  
21       report for?

22          A.       The first one was for an MDL  
23       litigation case.

24          Q.       And was that the -- that's the  
25       2022 report that you --

1           A.        Correct.

2           Q.        What kind of report did you  
3 prepare?

4                   MS. BAUGHMAN: Objection.

5                   Form.

6                   THE WITNESS: It was an expert  
7 report on behalf of my client.

8           Q.        BY MS. SILVERSTEIN: What was  
9 the subject matter of the report?

10          A.        Groundwater contamination.

11          Q.        Did you do a groundwater model  
12 for that report?

13          A.        Yes.

14          Q.        Was it a -- what kind of model  
15 was it?

16          A.        What do you mean?

17          Q.        Did you -- was it a post-audit?

18          A.        No. It was -- we built a  
19 model.

20          Q.        Okay. And when you say you  
21 built a model, were the -- was the model  
22 hindcasting?

23          A.        Yes.

24          Q.        About how many years of  
25 hindcasting did the model look at?

1           A.        Maybe 50 -- no. I can't  
2 remember.

3           Q.        Do you remember if it was more  
4 or less than 20 years?

5           A.        It -- it could have been 20.

6           Q.        What MDL was that for?

7           A.        It was the MDL for 3M.

8           Q.        And what -- what were your  
9 opinions in that report?

10           MS. BAUGHMAN: I'm not sure if  
11 he produced the report or not, so I  
12 don't know if this -- he was a  
13 consulting or a testifying expert.

14           So to the extent if you  
15 didn't -- if you didn't produce the  
16 report to the other side, there -- it  
17 may be confidential, so leave it up to  
18 you to let us know that.

19           THE WITNESS: It -- it was sent  
20 to the other side.

21           MS. BAUGHMAN: Okay. There you  
22 go.

23           Q.        BY MS. SILVERSTEIN: Was this  
24 the 3M earplugs litigation?

25           A.        The 3M what?

1 Q. Earplugs litigation.

2 A. No.

3 Q. What --

4 A. The 3M AFFF.

5 Q. Was your report on behalf of  
6 the plaintiffs or of the defendant?

7 A. To -- on behalf of 3M.

8 Q. And what was the site or  
9 location that you were modeling?

10 A. Stuart, Florida.

11 Q. What -- and you said this was  
12 the AFFF litigation. Were you modeling PFOS?

13 A. Yes.

14 Q. Were there any other  
15 contaminants that you were modeling?

16 A. No.

17 Q. How large was the area that you  
18 modeled?

19 A. Like in square miles?

20 Q. Yeah, that works.

21 A. I think it -- if I -- yeah, I'm  
22 not sure.

23 Q. Okay. Was it a flow or a  
24 transport model?

25 A. Both.

1 Q. Both.

2 And what kind of calibration  
3 data was available to you?

4 A. There was both flow and  
5 concentration data that was used.

6 Q. Did you have data available  
7 during the time periods that you were  
8 hindcasting?

9 MS. BAUGHMAN: Objection.

10 Form.

11 THE WITNESS: I would say  
12 partially.

13 Q. BY MS. SILVERSTEIN: What do  
14 you mean by "partially"?

15 A. It's -- it's hard to say did  
16 you have all of the data. We had some data.

17 Q. Did you have data for every  
18 year that you were modeling?

19 A. No, no.

20 Q. Did you -- do you recall how  
21 many pieces of data -- or data points you had  
22 to use for calibration?

23 A. No.

24 Q. Did you have data from the  
25 earliest year or two that you were

1 hindcasting?

2 MS. BAUGHMAN: Objection.

3 Form.

4 THE WITNESS: No, I don't  
5 recall.

6 Q. BY MS. SILVERSTEIN: And do you  
7 remember what time span you were modeling? I  
8 know you said you don't remember the exact  
9 number of years, but was this, for example,  
10 in the 2000s? Before then?

11 A. It was roughly from the 2000s  
12 and then it went forward into the future.

13 Q. By "in the future" do you  
14 mean -- were you hindcasting up to the -- the  
15 date that you were working on the model?

16 A. Correct.

17 Q. And did you have, like, for  
18 2022, present-day data?

19 A. I believe so, yes.

20 Q. And what were the results of  
21 the model being used for?

22 A. To understand the movement of  
23 PFOS AFFF material in the ground.

24 Q. And you said there was another  
25 expert report that you worked on in 2024; is

1       that right?

2           A.       Correct.

3           Q.       What kind of case was that for?

4           A.       I was representing our client  
5       in Minnesota, and they were being accused of  
6       impacting groundwater and surface water  
7       bodies.

8           Q.       What kind of contaminants?

9           A.       No contaminants.

10          Q.       You said "No contaminants," so  
11       were you doing a water model?

12          A.       Correct.

13          Q.       What kind of model were you  
14       working on?

15          A.       A groundwater model.

16          Q.       Okay. So were you looking  
17       at -- if you weren't looking at contaminants,  
18       what -- what were you looking at?

19          A.       Impacts to groundwater and  
20       impacts to surface water bodies.

21          Q.       The impacts of what?

22          A.       From pumping from our client.

23          Q.       Do you -- so would that  
24       include, for example, like, how the water  
25       levels changed or how the movement of the

1 water changed?

2 A. Correct.

3 Q. How large of an area were you  
4 modeling?

5 A. That was several square miles.

6 That was probably 150 square miles, maybe  
7 120 square miles.

8 Q. Do you recall if the modeling  
9 area you looked at in 2024 was bigger or  
10 smaller than the area you looked at in your  
11 2022 report?

12 A. Bigger.

13 Q. What kind of data piece --  
14 points did you have available to you for the  
15 2024 model?

16 A. Monitoring level data, stream  
17 gauge data, stage level data in lakes,  
18 recharge data, lots of reports of  
19 stratigraphy and climate and -- generally the  
20 data that goes into a groundwater model.

21 Q. When you say "generally the  
22 data that goes into a groundwater model," are  
23 there specific types of data that you're  
24 referring to?

25 A. Well, generally, groundwater

1 models have lots of parameters. Things like  
2 hydraulic connectivity, storage and porosity,  
3 elevations, all those kind of parameters.

4 Q. And ideally would those kind of  
5 parameters be site-specific?

6 MS. BAUGHMAN: Objection.

7 Form.

8 THE WITNESS: Well, you want to  
9 try to match the specific site, yes,  
10 so...

11 Q. BY MS. SILVERSTEIN: Do you  
12 remember how long of a time period you were  
13 modeling in the 2024 report?

14 A. We probably spent six months,  
15 eight months on building that model.

16 Q. Were you -- was that a  
17 hindcasting model or a -- a forward-looking  
18 model?

19 A. Both.

20 Q. Okay. In terms of the  
21 hindcasting time period, how many years were  
22 you hindcasting?

23 A. I can't remember.

24 Q. Do you remember if it was more  
25 or less than ten years?

1           A.       It was more.

2           Q.       Do you remember if it was more  
3 or less than 20 years?

4           A.       I believe it was more.

5           Q.       Okay. Did you have data points  
6 or at least a data point for every year that  
7 you modeled?

8           A.       No.

9           Q.       How many years -- did you have  
10 data point -- a data point for the earliest  
11 year that you modeled?

12          A.       I can't remember.

13          Q.       I want to talk again about the  
14 2022 report that you did.

15                 Were the results of that model  
16 used to estimate exposure in individuals?

17                 MS. BAUGHMAN: Objection.

18                 Form.

19                 THE WITNESS: I don't know.

20          Q.       BY MS. SILVERSTEIN: Do you  
21 know what the results of that model were used  
22 for?

23                 MS. BAUGHMAN: Objection.

24                 Form.

25                 THE WITNESS: I would say yes.

1 Q. BY MS. SILVERSTEIN: And what  
2 was that?

3 A. To understand the -- the extent  
4 and movement of the AFFF in the groundwater.

5 Q. Would it be correct to say that  
6 that model estimated contaminant  
7 concentrations in the water?

8 A. Yes.

9 Q. Aside from the expert reports  
10 that we discussed in 2022 and 2024 and your  
11 reports in the Camp Lejeune litigation, have  
12 you worked on -- have you written any other  
13 expert reports?

14 MS. BAUGHMAN: Objection.

15 Form.

16 You mean for litigation?

17 MS. SILVERSTEIN: Yes.

18 Q. For litigation, have you  
19 written any other expert reports?

20 A. That I -- that was signed by  
21 me, no.

22 Q. Have you worked on other expert  
23 reports for litigation?

24 A. Yes.

25 Q. Who did you work with?

1                   MS. BAUGHMAN: Again, just  
2 caution you about confidentiality and  
3 leave it up to you to protect whatever  
4 confidential information you might  
5 have of your clients; okay?

6                   THE WITNESS: I would say I  
7 can't -- I can't say.

8                   Q.         BY MS. SILVERSTEIN: Did you  
9 work with Dr. Jones on expert reports --

10                  A.         No.

11                  Q.         -- for litigation?

12                  A.         No.

13                  Q.         Have you -- aside from the  
14 expert reports that we've discussed and  
15 expert reports that you may have helped on  
16 but did not sign, have you been involved in  
17 any kind of -- have you otherwise been  
18 involved in litigation?

19                  A.         Yes.

20                  Q.         What kind of litigation?

21                  A.         Litigation cases involving  
22 groundwater, groundwater impacts, groundwater  
23 withdrawals.

24                  Q.         All right. And are there cases  
25 that you've been involved in involving

1 groundwater impacts or withdrawals that you  
2 did not prepare or work on an expert report  
3 for?

4 A. Yes.

5 Q. So how were you -- what was  
6 your role in those cases?

7 A. Generally it was doing  
8 groundwater modeling.

9 Q. Okay. And so would you then do  
10 groundwater modeling and not prepare a  
11 report?

12 A. I was -- I had a role of  
13 basically a consulting expert.

14 Q. Okay. So you did work and it  
15 wasn't disclosed in the case; is that right?

16 A. Correct.

17 Q. What kind of -- were any of  
18 those models that you worked on hindcasting  
19 models?

20 MS. BAUGHMAN: And these are  
21 just for litigation purposes that  
22 you're asking?

23 Q. BY MS. SILVERSTEIN: For  
24 litigation purposes for any of the models  
25 that you worked on as a consulting expert

1 hindcasting models.

2 A. I would say yes, but I couldn't  
3 tell you -- I couldn't remember, you know,  
4 specific ones, but I would say yes.

5 Q. Were any of the reports that  
6 you've worked on that weren't disclosed in  
7 litigation, were any of those post-audits?

8 MS. BAUGHMAN: Objection.

9 Form.

10 THE WITNESS: Describe your  
11 definition of post-audit.

12 Q. BY MS. SILVERSTEIN: So that --  
13 that's a great question. How would you title  
14 the -- your report as a post-audit? What do  
15 you mean by "post-audit"?

16 A. In this sense, for this  
17 particular case, we took an existing  
18 calibrated groundwater and flow transport  
19 model and extended it, and extended it  
20 forward in time and looked at the results of  
21 that model compared to data that existed  
22 within that extended time.

23 Q. Do you recall any other  
24 instances where you've taken an existing  
25 model that's already been calibrated and

1       looked to see how it performs with additional  
2       data points after the model period?

3           A.       Yes.

4           Q.       In what circumstances?

5           A.       I have a current one in the  
6       state of New Jersey where I do that very  
7       thing.

8           Q.       Is that for litigation?

9           A.       Yes. But that litigation was  
10      settled last year.

11          Q.       Okay. What litigation was  
12      that?

13           MS. BAUGHMAN: This is ongoing,  
14       Jeff, that I'm counting on you for the  
15       confidentiality issue; okay?

16           THE WITNESS: Yeah, I probably  
17      should not say.

18          Q.       BY MS. SILVERSTEIN: What --  
19       what was your -- if I refer to the model that  
20       you mentioned in New Jersey as a post-audit,  
21       will you understand what I'm referring to?

22          A.       (Witness nods head.)

23          Q.       What was the post-audit -- what  
24       were the post-audit results used for?

25           MS. BAUGHMAN: Objection.

1                   Form.

2                   THE WITNESS: Just to  
3                   understand the movement of the  
4                   contamination plume with the new data.

5                   Q.         BY MS. SILVERSTEIN: And to  
6                   your knowledge, was the New Jersey post-audit  
7                   that you worked on used to estimate exposure  
8                   in specific individuals?

9                   MS. BAUGHMAN: Objection.

10                  Form.

11                  THE WITNESS: No.

12                  Q.         BY MS. SILVERSTEIN: How much  
13                  are you being paid for your work on this  
14                  case?

15                  A.         I believe it's stated in my --  
16                  both of my reports. I'm being paid 498 an  
17                  hour.

18                  Q.         How much have you billed to  
19                  date?

20                  MS. BAUGHMAN: Objection.

21                  Form.

22                  I believe we produced the  
23                  bills.

24                  Q.         BY MS. SILVERSTEIN: How much  
25                  have you been billed to date?

1 MS. BAUGHMAN: If you know.

2 THE WITNESS: I've -- I believe  
3 Integral's bills to the legal team are  
4 roughly 160,000.

5 Q. BY MS. SILVERSTEIN: How much  
6 have you been paid for your work on this  
7 case?

8 MS. BAUGHMAN: Objection.

9 Form.

10 THE WITNESS: I'm a consultant  
11 for a firm that I'm a principal in, so  
12 it's just my normal salary.

13 Q. BY MS. SILVERSTEIN: Okay. Do  
14 you know how much -- when you say "a firm,"  
15 are you referring to Integral?

16 A. Correct.

17 Q. Do you know how much Integral  
18 has been paid for your work on this case?

19 A. I just stated that.

20 Q. Has -- so you said that you  
21 billed about \$160,000; is that right?

22 A. Correct.

23 Q. Has all of that been paid to  
24 date?

25 A. I couldn't tell you.

1           Q.       Does your compensation depend  
2       on the outcome of this court case?

3           A.       No.

4           Q.       Have you ever worked on a  
5       groundwater flow or transport model that has  
6       been used to estimate exposure in specific  
7       individuals?

8                   MS. BAUGHMAN: Objection.

9                   Form.

10                  THE WITNESS: My answer would  
11       be that I would say I don't know if  
12       that -- if that was how it was used.

13                  Q.       BY MS. SILVERSTEIN: So you're  
14       not aware of any time that a flow or --  
15       groundwater flow or transport model you've  
16       worked on has been used to estimate exposure  
17       in specific individuals; is that fair to say?

18                  A.       Yes.

19                  Q.       I'm handing you exhibit -- I  
20       think we're on 4.

21                  A.       Four?

22                   (Exhibit 4 was marked for identification.)

23                  Q.       BY MS. SILVERSTEIN: Handed you  
24       Exhibit 4. This was attached to your initial  
25       report as Exhibit 1 and is titled "Resum? for

1 R. Jeffrey Davis."

2 Is this a copy of your resum??

3 A. Yes.

4 Q. And does it appear to be a fair  
5 and accurate copy?

6 A. Yes.

7 Q. Looking through your resum?, is  
8 there anything that you want to change or  
9 add?

10 A. No.

11 Q. If anything comes to mind that  
12 you've worked on or have experience in that  
13 isn't in your resum?, please let me know.

14 A. Okay.

15 Q. And you received your  
16 bachelor's degree and master's degree in  
17 civil and environmental engineering from BYU;  
18 is that right?

19 A. Correct.

20 Q. Did you pursue or obtain any  
21 education beyond your master's degree?

22 A. Yes. I was working on my PhD  
23 before I left to go form a consulting  
24 company.

25 Q. When was -- when were you

1 working on your PhD?

2 A. In the '90s.

3 Q. And what was your PhD for?

4 A. Civil and environmental  
5 engineering.

6 Q. Was that also at BYU?

7 A. Correct.

8 Q. And why did you leave the PhD  
9 program?

10 A. I had the opportunity to run a  
11 consulting company.

12 Q. Was that a program that was  
13 joint with the master's degree you received  
14 or was that separate?

15 MS. BAUGHMAN: Objection.

16 Form.

17 THE WITNESS: I suppose it was  
18 separate.

19 Q. BY MS. SILVERSTEIN: And by  
20 "separate," I mean, did you apply for and  
21 obtain your master's and then apply for and  
22 start your PhD, or did you start it as one  
23 program?

24 A. I started it as one.

25 Q. Did you have a specific

1 concentration in your master's program?

2 A. It was all primarily  
3 groundwater-related.

4 Q. When you say  
5 "groundwater-related," could you describe  
6 what that means.

7 A. Hydrogeology, groundwater  
8 principles, groundwater modeling, subsurface  
9 characterization.

10 Q. So then it sounds like you  
11 would have taken classes specific to  
12 groundwater modeling?

13 A. Correct.

14 Q. Have you taken any, like,  
15 continuing education courses or seminars  
16 about groundwater modeling since finishing  
17 your degree?

18 A. No. But I've taught hundreds  
19 of courses in groundwater modeling across the  
20 world.

21 Q. Would it be fair to say that  
22 you consider yourself an expert in  
23 groundwater modeling?

24 A. Yes.

25 Q. Do you consider yourself an

1 expert in any other field?

2 MS. BAUGHMAN: Objection to  
3 form.

4 THE WITNESS: Other than civil  
5 environmental engineering and  
6 hydrogeology, no.

7 Q. BY MS. SILVERSTEIN: Is your  
8 expertise in hydrogeology, is that based on  
9 the same education as your expertise in  
10 groundwater modeling?

11 A. Correct.

12 Q. Would it be -- so you  
13 wouldn't -- you're not a toxicologist; right?

14 A. No.

15 Q. So you don't consider yourself  
16 an expert in toxicology?

17 A. No.

18 Q. And you're not an  
19 epidemiologist?

20 A. No.

21 Q. I want to go ahead and turn to  
22 Page 5 of your resum?. There's a heading at  
23 the top of that page that says "Groundwater  
24 modeling."

25 Do you see where?

1           A.       Yes.

2           Q.       Are these all of the  
3       groundwater modeling projects that you've  
4       worked on?

5           A.       No.

6           Q.       How many groundwater projects  
7       have you worked -- groundwater modeling  
8       projects have you worked on that are not  
9       included?

10          A.       Hundreds.

11          Q.       When was the earliest  
12      groundwater modeling project that you worked  
13      on?

14          A.       Probably in the early '90s.

15          Q.       Would that have been while you  
16      were pursuing your education?

17          A.       And while I was a full-time  
18      employee.

19          Q.       Employee where?

20          A.       At Brigham Young University.

21          Q.       Okay. Are any of these  
22      groundwater modeling projects listed on your  
23      resum? hindcasting projects?

24          A.       Yes. I would say the second  
25      one is.

1 Q. Okay.

2 A. The crop production services  
3 would be. And -- yeah. Those two for sure.

4 Q. Okay. I want to talk about the  
5 groundwater modeling -- the groundwater model  
6 development New Jersey project.

7 When you say that that was a  
8 hindcasting project, what do you mean by  
9 "hindcasting"?

10 A. We built a model to try to  
11 understand where the source of contamination  
12 started and -- and how -- how it would have  
13 moved through the ground in the past.

14 Q. Okay. What kind of -- how long  
15 of a time period did you look at for that  
16 project?

17 A. 50 years.

18 Q. Okay. And when -- if, you  
19 know, the earliest day is year one and the  
20 latest date that you're looking at closest to  
21 the present is year 50, when did you first  
22 have data?

23 MS. BAUGHMAN: Objection.

24 Form.

25 THE WITNESS: I don't recall.

1 Q. BY MS. SILVERSTEIN: Did you  
2 have data for the earliest year that you  
3 looked at?

4 MS. BAUGHMAN: Objection.

5 Form.

6 What kind of data are you  
7 referring to?

8 MS. SILVERSTEIN: Any data.

9 Q. Did you have any data from the  
10 earliest point you were looking at?

11 A. Limited.

12 Q. When you say "limited," what do  
13 you mean?

14 A. More than one, less -- I -- you  
15 know, limited data.

16 Q. Was that concentration data?

17 A. I don't believe so.

18 Q. What was the earliest point in  
19 that hindcasting project that you worked on  
20 that you had concentration data for?

21 A. I don't recall.

22 Q. Did you have well pumping data  
23 from the first year that you modeled?

24 A. No.

25 Q. Did you have flow data for the

1           first year that you modeled?

2           A.        Limited.

3           Q.        When you say "limited," do you  
4       mean just a few data points?

5           A.        Actually, I -- I would ask a  
6       question. What do you mean by "flow data"?

7           Q.        So if I say "flow data," do  
8       you -- how would you understand that?

9                   MS. BAUGHMAN: Objection.

10                  Form.

11                  I think he just said he doesn't  
12       understand it.

13                  THE WITNESS: Yeah, I'm not  
14       sure --

15                  Q.        BY MS. SILVERSTEIN: Did you  
16       have data about the level of the water that  
17       you were modeling?

18                  A.        Water levels. You asked that  
19       question and I said that was limited.

20                  Q.        Okay. Did you have data about  
21       which wells were pumping at the time?

22                  A.        Limited.

23                  Q.        When you say "limited," do you  
24       mean limited in the number of data points?

25                  A.        Yes.

1 Q. Was that New Jersey hindcasting  
2 model, was that contaminant fate and  
3 transport?

4 A. Correct.

5 Q. Was it for a water distribution  
6 system?

7 A. I'm not sure what you mean.

8 Q. What kind of water system were  
9 you modeling?

10 MS. BAUGHMAN: Objection.

11 Form.

12 THE WITNESS: Groundwater.

13 Q. BY MS. SILVERSTEIN: Okay. And  
14 so is that -- was that a water system that  
15 was being used to provide drinking water, for  
16 example?

17 A. Yes.

18 Q. What were the results of  
19 that -- of your modeling used for?

20 MS. BAUGHMAN: Objection.

21 Form.

22 THE WITNESS: I probably can't  
23 say.

24 Q. BY MS. SILVERSTEIN: Were they  
25 used to estimate exposure in a specific

1 individual?

2 MS. BAUGHMAN: Objection.

3 Form.

4 THE WITNESS: I couldn't say.

5 Q. BY MS. SILVERSTEIN: And when  
6 you say you can't say, is that because you  
7 don't know?

8 A. No.

9 MS. BAUGHMAN: Is it because  
10 it's confidential?

11 THE WITNESS: Yeah, it's  
12 confidential.

13 Q. BY MS. SILVERSTEIN: Okay.  
14 Okay. The other -- well, why is it  
15 confidential?

16 A. Well, it's my understanding  
17 that the case was settled last year, but it  
18 is pretty new, and so I'm not sure that I'm  
19 at liberty to say much about the case still  
20 at this point.

21 Q. Have you been told by whoever  
22 you were working for in that case that it was  
23 confidential?

24 A. Yes.

25 Q. Did you write a report in that

1 case?

2 A. No.

3 Q. What kind of work product did  
4 you prepare in that case?

5 A. To this point, just figures.

6 Q. Okay. And -- okay. And do you  
7 know what those figures were used for?

8 A. No.

9 Q. The other project listed on  
10 your resum? that you said was hindcasting is  
11 crop production services, various locations  
12 U.S.; is that correct?

13 A. Correct.

14 Q. And why do you describe that as  
15 hindcasting?

16 A. We -- I was building models to  
17 go back in time to understand nitrate  
18 contamination at a number of sites across the  
19 country.

20 Q. Okay. And when you were  
21 building models back in time, how long of a  
22 time period were you looking at?

23 A. It varied. 10, 20, 30, 40,  
24 50 years.

25 Q. Okay. And did you have nitrate

1 concentration data that you used in that  
2 project?

3 A. Usually not.

4 Q. Did you have well pumping data  
5 that you used in that project?

6 A. Limited.

7 Q. What kind of -- well, and you  
8 said in various locations. How many  
9 locations did you model?

10 A. I'd say a dozen, maybe more.

11 Q. And what region were those?

12 A. Across the country.

13 Q. So would that be, you know,  
14 desert, mountains?

15 A. Correct.

16 Q. Okay.

17 A. All -- all sorts of places.

18 Q. Okay. How -- what geographic  
19 size were these locations?

20 A. They were pretty small.

21 Q. What do you mean by "pretty  
22 small"?

23 A. Maybe a few square miles.

24 Q. Was this where -- the crop  
25 production services, was that related to a

1       court case?

2           A.       I -- I don't know.

3           Q.       Do you know what the results of  
4       that modeling were used for?

5           A.       No.

6           MS. BAUGHMAN: Objection to  
7       form.

8           THE WITNESS: No.

9           Q.       BY MS. SILVERSTEIN: For the  
10      hindcasting project in New Jersey, did you do  
11      a sensitivity analysis?

12          A.       Yes.

13          Q.       What -- how did you do a  
14      sensitivity analysis?

15          A.       We looked at ranges of the  
16      different parameters that we felt were going  
17      to influence the model, and we looked at  
18      different ranges and ran the model for those  
19      ranges to look and see how sensitive that  
20      particular parameter was.

21          Q.       And did you do an uncertainty  
22      analysis?

23          A.       No.

24          Q.       For the crop production  
25      services work that you did, did you do a

1       sensitivity analysis?

2           A.       Very limited.

3           Q.       What do you mean by "very  
4       limited"?

5           A.       Maybe looking at one parameter  
6       or two parameters.

7           Q.       Okay. For the crop production  
8       services work, did you do an uncertainty  
9       analysis?

10          A.       No.

11               MS. SILVERSTEIN: Okay. We've  
12       been going for about an hour, so I  
13       think this would be a good time for a  
14       break.

15               THE WITNESS: Sure.

16               THE VIDEOGRAPHER: We're off  
17       record. The time is 10:15.

18               (There was a break taken.)

19               THE VIDEOGRAPHER: We're back  
20       on the record. The time is 10:29.

21       This is Media Number 2.

22               Counsel may proceed.

23           Q.       BY MS. SILVERSTEIN: Mr. Davis,  
24       we talked a lot about some of the work that  
25       you've done for litigation regarding

1 groundwater modeling.

2 Have you been involved in  
3 litigation in any way other than related to  
4 groundwater modeling?

5 A. No.

6 Q. Have you ever been involved in  
7 personal litigation?

8 A. Does a divorce count? Yes.

9 Q. Aside from a divorce, have you  
10 been involved in any personal litigation?

11 A. No.

12 Q. I want to talk about the ATSDR  
13 water modeling reports.

14 A. Okay.

15 Q. You reviewed the ATSDR Tarawa  
16 Terrace reports?

17 A. Yes.

18 Q. And my understanding is that  
19 you reviewed Chapters A, C, and F for Tarawa  
20 Terrace; is that correct?

21 A. That sounds correct.

22 Q. Did you review any other Tarawa  
23 Terrace chapters?

24 A. To the best of my knowledge,  
25 no.

1           Q.       Did you review any of the  
2 Hadnot Point/Holcomb Boulevard chapters?

3           A.       No.

4           Q.       And just to be clear, you  
5 aren't offering any opinions about the Hadnot  
6 Point/Holcomb Boulevard model; is that  
7 correct?

8           A.       Correct.

9           Q.       Why did you not perform a  
10 post-audit for the Hadnot Point/Holcomb  
11 Boulevard model?

12                  MS. BAUGHMAN: Objection.  
13                  Form.

14                  THE WITNESS: We weren't asked  
15                  to.

16                  MS. SILVERSTEIN: I'm handing  
17                  you Exhibit 5.

18                  (Exhibit 5 was marked for identification.)

19                  Q.       BY MS. SILVERSTEIN: Exhibit 5  
20                  is titled "Analyses of Groundwater Flow,  
21                  Contaminant Fate and Transport and  
22                  Distribution of Drinking Water At Tarawa  
23                  Terrace and Vicinity, U.S. Marine Corps Base  
24                  Camp Lejeune, North Carolina: Historical  
25                  Reconstruction and Present-Day Conditions.

1       Chapter A: Summary of Findings"; is that  
2       correct?

3           A.       Yes.

4           Q.       And you said you reviewed this  
5       in preparing your report?

6           A.       Yes.

7           Q.       If you could turn to the  
8       page that is Roman Numeral iii with three  
9       little i's, it says "Foreword." The Bates  
10      stamp on the bottom ends in 642. It's right  
11      at the front.

12       A.       642, 644. 642, okay.

13       Q.       And do you see where it says  
14      "Foreword" at the top?

15       A.       Uh-huh.

16       Q.       In the first paragraph here it  
17      says "The Agency for Toxic Substances and  
18      Disease Registry (ATSDR), an agency of the  
19      U.S. Department of Health and Human Services,  
20      is conducting an epidemiological study to  
21      evaluate whether in utero and infant (up to  
22      one year of age) exposures to volatile  
23      organic compounds in contaminated drinking  
24      water at U.S. Marine Corps Base Camp Lejeune,  
25      North Carolina, were associated with specific

1       birth defects and childhood cancers. The  
2       study includes births occurring during the  
3       period 1968 to 1985 to women who were  
4       pregnant while they resided in family housing  
5       at the base. During 2004, the study protocol  
6       received approval from the Centers for  
7       Disease Control and Prevention Institutional  
8       Review Board and the U.S. Office of  
9       Management and Budget."

10                  Did I read that correctly?

11                  A.       Yes.

12                  Q.       And then the next paragraph  
13        says "Historical exposure data needed for the  
14       epidemiological case-control study are  
15       limited. To obtain estimates of historical  
16       exposure, ATSDR is using water-modeling  
17       techniques and the process of historical  
18       reconstruction. These methods are used to  
19       quantify concentrations of particular  
20       contaminants and finished water and to  
21       compute the level and duration of human  
22       exposure to contaminated drinking water."

23                  Did I read that correctly?

24                  A.       Yes.

25                  Q.       When you conducted your

1 post-audit on the Tarawa Terrace model, you  
2 were aware that AT -- that the ATSDR model  
3 was not intended to estimate exposures to  
4 individuals so that the individual could  
5 determine whether an estimated exposure  
6 caused his or her health concern?

7 MS. BAUGHMAN: Objection. Form  
8 and foundation.

9 THE WITNESS: Can you repeat  
10 the question again?

11 Q. BY MS. SILVERSTEIN: Sure.

12 When you conducted the  
13 post-audit on Tarawa Terrace, you were aware  
14 that the ATSDR model was not intended to  
15 estimate exposures to individuals, that  
16 the -- the individual could determine whether  
17 an estimated exposure caused his or her  
18 health condition?

19 MS. BAUGHMAN: Objection; form.  
20 Objection; Foundation.

21 THE WITNESS: I wasn't aware of  
22 either, either way.

23 Q. BY MS. SILVERSTEIN: Were you  
24 aware of what the purpose of the ATSDR water  
25 model for the Tarawa Terrace drinking water

1 system was intended for?

2 MS. BAUGHMAN: Objection. Form  
3 and foundation.

4 THE WITNESS: Only to the  
5 extent of what it was written.

6 Q. BY MS. SILVERSTEIN: Okay. So  
7 if it was -- if what it was intended for was  
8 written in the ATSDR report, you were aware  
9 of that?

10 A. Correct.

11 Q. Do you -- is it important to  
12 understand the purpose of a model before you  
13 create the model?

14 MS. BAUGHMAN: Objection.  
15 Form.

16 THE WITNESS: Yes.

17 Q. BY MS. SILVERSTEIN: Why?

18 A. That's -- in my experience,  
19 that's the foundation for building a model,  
20 especially in a groundwater model, is how  
21 it's going to be used.

22 Q. When you are working on a  
23 post-audit, is it important to understand the  
24 purpose of the model that you are doing a  
25 post-audit of?

1 MS. BAUGHMAN: Objection.  
2 Form.

3 THE WITNESS: Sure.

4 Q. BY MS. SILVERSTEIN: When you  
5 were working on the post-audit for the Tarawa  
6 Terrace drinking water system, did you  
7 consider the Navy's criticism on the ATSDR  
8 model in forming your opinion?

9 MS. BAUGHMAN: Objection.  
10 Form.

11 THE WITNESS: I wasn't aware of  
12 the Navy's criticism.

13 Q. BY MS. SILVERSTEIN: So then  
14 were you aware of Mr. Maslia's response to  
15 the Navy criticism?

16 MS. BAUGHMAN: Objection.  
17 Form.

18 THE WITNESS: No.

19 Q. BY MS. SILVERSTEIN: Morris  
20 Maslia is the lead of the ATSDR water  
21 modeling effort at Camp Lejeune; is that  
22 correct?

23 MS. BAUGHMAN: Objection to  
24 form. Foundation.

25 THE WITNESS: It's my

1                   understanding, yes.

2                   Q.         BY MS. SILVERSTEIN: And you're  
3                   aware that Mr. Maslia is serving as an expert  
4                   for the plaintiffs in this litigation?

5                   A.         Yes.

6                   MS. SILVERSTEIN: I'm handing  
7                   you Exhibit 6.

8                   (Exhibit 6 was marked for identification.)

9                   Q.         BY MS. SILVERSTEIN: This is --  
10                  Exhibit 6 is titled "Analyses of Groundwater  
11                  Flow, Contaminant Fate and Transport and  
12                  Distribution of Drinking Water at Tarawa  
13                  Terrace and Vicinity, U.S. Marine Corps Base  
14                  Camp Lejeune, North Carolina: Historical  
15                  Reconstruction and Present-Day Conditions.  
16                  Response to the Department of the Navy's  
17                  Letter on Assessment of ATSDR Water Modeling  
18                  for Tarawa Terrace."

19                  Have you seen this document  
20                  before?

21                  A.         I don't believe so.

22                  Q.         Were you aware when you  
23                  conducted your post-audit that Morris Maslia  
24                  stated "A successful epidemiological study  
25                  places little emphasis on the actual absolute

1 estimate of concentration and, rather,  
2 emphasizes the relative level of exposure"?

3 MS. BAUGHMAN: Objection. Form  
4 and foundation.

5 What are you reading from? You  
6 need to show him the document.

7 THE WITNESS: Yeah, I don't  
8 know if --

9 Q. BY MS. SILVERSTEIN: Had you  
10 read any statement like that from Mr. Maslia  
11 when you prepared your report?

12 MS. BAUGHMAN: Same objections.

13 THE WITNESS: No.

14 Q. BY MS. SILVERSTEIN: In your  
15 report regarding the Tarawa Terrace model,  
16 you opined that the model used sound  
17 methodology and provided reliable insights to  
18 the migration of PCE contamination; is that  
19 correct?

20 A. Yes.

21 Q. Are you opining that the model  
22 reliably or accurately estimates monthly  
23 contaminant concentration levels for  
24 individuals?

25 MS. BAUGHMAN: Objection.

1                   Form.

2                   THE WITNESS: No.

3                   Q.         BY MS. SILVERSTEIN: You opined  
4                   that the post-audit found that the original  
5                   Tarawa Terrace groundwater flow --  
6                   groundwater flow and transport models were  
7                   developed using sound methodology. Sorry.

8                   You opine that the model  
9                   effectively simulates long-term trends and  
10                  contaminant migration; is that correct?

11                  A.         Yes.

12                  Q.         And that you can find no  
13                  significant evidence that would invalidate  
14                  the analyses performed by ATSDR with the  
15                  original model; right?

16                  A.         Yes.

17                  Q.         If you could turn to in  
18                  Exhibit 6 the Bates ending in 33272.

19                  A.         What page?

20                  Q.         Do you see the Bates numbers on  
21                  the bottom?

22                  A.         Yeah.

23                  Q.         It ends in 33 -- oh, sorry --  
24                  33272.

25                  A.         272. Okay.

1 Q. And I want to direct you to the  
2 last paragraph --

3 A. Okay.

4 Q. -- on that page.

5 It says "To address the issue  
6 of the intended use of the water-modeling  
7 results by the current ATSDR epidemiological  
8 study, the DON should be advised that a  
9 successful epidemiological study places  
10 little emphasis on the actual (absolute)  
11 estimate of concentration and, rather,  
12 emphasizes the relative level of exposure.  
13 That is, exposed individuals are, in effect,  
14 ranked by exposure level and maintain their  
15 rank order of exposure level regardless of  
16 how far off the estimated concentration is to  
17 the 'true' (measured) PCE concentration.  
18 This rank order of exposure level is  
19 preserved regardless of whether the mean or  
20 the upper or lower 95 percent of simulated  
21 levels are used to estimate the monthly  
22 average contaminant levels. It is not the  
23 goal of the ATSDR health study to infer which  
24 health effects occur at specific PCE  
25 concentrations - that is a task for risk

1 assessment utilizing approaches such as  
2 meta-analysis to summarize evidence from  
3 several epidemiological studies because a  
4 single epidemiological study is generally  
5 insufficient to make this determination."

6 Did I read that correctly?

7 A. Yes.

8 Q. And did you consider that  
9 response, that paragraph, when you were  
10 preparing your report?

11 MS. BAUGHMAN: Objection. Form  
12 and foundation.

13 He -- he already said he hasn't  
14 read the document.

15 THE WITNESS: Yeah, that's  
16 correct. I -- this is the first time  
17 reading this, so the answer would be  
18 no.

19 Q. BY MS. SILVERSTEIN: Okay. And  
20 you aren't opining that the model can be used  
21 to estimate exposure caused by -- exposure --  
22 whether a specific exposure caused an  
23 individual's health condition; right?

24 MS. BAUGHMAN: Objection. Form  
25 and foundation.

1                   THE WITNESS: They're not my  
2                   area of expertise.

3                   Q.         BY MS. SILVERSTEIN: And is it  
4                   your understanding that the model was used --  
5                   was intended to be used for an  
6                   epidemiological study?

7                   MS. BAUGHMAN: Objection. Form  
8                   and foundation.

9                   THE WITNESS: Based on what I  
10                  have read in the reports, that's what  
11                  it says.

12                  Q.         BY MS. SILVERSTEIN: Okay. I  
13                  want to direct you back to Exhibit 5, which  
14                  is Chapter A. And if you could turn to  
15                  Page A-98, which is the Bates stamp ending  
16                  15749.

17                  A.         5749. Okay.

18                  Q.         And if you could look at the  
19                  fourth paragraph down, it says "ATSDR's  
20                  exposure assessment cannot be used to  
21                  determine whether you, or your family,  
22                  suffered any health effects as the result of  
23                  past exposure to PCE-contaminated drinking  
24                  water at Camp Lejeune."

25                  Do you see that?

1           A.        Yep.

2           Q.        Do you agree that ATSDR's  
3     exposure assessment cannot be used to  
4     determine whether a person suffered any  
5     health effects as a result of the past  
6     exposure?

7                  MS. BAUGHMAN: Objection. Form  
8     and foundation.

9                  THE WITNESS: It's not my area  
10    of expertise.

11           Q.        BY MS. SILVERSTEIN: If you  
12    would look at Page A67. And that has the  
13    Bates ending in 5718.

14           A.        Uh-huh.

15           Q.        Would you agree that the Tarawa  
16    Terrace drinking water system's largest  
17    contaminant was PCE?

18                  MS. BAUGHMAN: Objection.

19                  Form. Foundation.

20                  THE WITNESS: That's my  
21    understanding.

22           Q.        BY MS. SILVERSTEIN: And is it  
23    your understanding that the PCE came from  
24    ABC One-Hour Cleaners?

25           A.        That's my understanding.

1 Q. And you agree that ATSDR did  
2 not simulate benzene concentrations at Tarawa  
3 Terrace; right?

4 MS. BAUGHMAN: Objection. Form  
5 and foundation.

6 THE WITNESS: That's my  
7 understanding.

8 Q. BY MS. SILVERSTEIN: In your  
9 post-audit, you also didn't look at whether  
10 any benzene concentrations were reliably  
11 simulated by ATSDR's model; right?

12 A. Correct.

13 Q. Your post-audit only looked at  
14 PCE; right?

15 A. Correct.

16 Q. It didn't evaluate PCE  
17 byproducts, did it?

18 A. Correct.

19 Q. I want to go to Page A17.

20 Would it be accurate to say  
21 that the Tarawa Terrace drinking water supply  
22 from 1953 to 1985 consisted of water supplied  
23 from the groundwater wells to the Tarawa  
24 Terrace water treatment plant and delivery of  
25 finished water from the water treatment plant

1       through the Tarawa Terrace water distribution  
2       system storage tanks and piping network?

3                     MS. BAUGHMAN: Objection.

4                     Form.

5                     Are you reading from the  
6       document?

7                     MS. SILVERSTEIN: I'm asking  
8       him a question, if his understanding  
9       is that the Tarawa Terrace's drinking  
10      water supply from 1953 to 1985  
11      consisted of water supplied from  
12      groundwater wells to the Tarawa  
13      Terrace water treatment plant and  
14      delivery of finished water from the  
15      water treatment plant through the  
16      Tarawa Terrace water distribution  
17      system's storage tanks and piping  
18      network.

19                  Q.       Is that your understanding?

20                  A.       Yes.

21                  Q.       Would you agree that the  
22      groundwater wells in the Tarawa Terrace area  
23      supplied untreated water to a central  
24      treatment facility?

25                  A.       That's my understanding.

1           Q.        Okay. And you would agree that  
2       the dates when those started and stopped  
3       supplying water are important to  
4       historical -- the historical concentrations  
5       in the water delivered from the Tarawa  
6       Terrace water treatment plant?

7                   MS. BAUGHMAN: Objection.

8                   Form.

9                   THE WITNESS: Can you ask that  
10          question again?

11          Q.        BY MS. SILVERSTEIN: Sure.

12                   When you were looking to  
13       determine what the historical concentrations  
14       in water delivered from the Tarawa Terrace --  
15       delivered -- yeah, delivered from the Tarawa  
16       Terrace water treatment plant, it is critical  
17       to know when wells started and stopped  
18       supplying water; is that right?

19                   MS. BAUGHMAN: Objection.

20                   Form.

21                   THE WITNESS: That -- that  
22       information would be helpful.

23          Q.        BY MS. SILVERSTEIN: Because  
24       that will tell you -- that will help tell you  
25       how the contaminants were moving?

1 MS. BAUGHMAN: Objection.

2 Form.

3 THE WITNESS: How they're  
4 moving? In the groundwater?

5 Q. BY MS. SILVERSTEIN: Why would  
6 that information be helpful?

7 A. It's my understanding that the  
8 wells that were pumping from the ground were  
9 delivering water to the treatment plant.

10 Q. And, similarly, wells that were  
11 not pumping were not delivering water to the  
12 water treatment plant?

13 A. Yeah, that would be physically  
14 impossible.

15 Q. And so to understand what  
16 historical concentration is, it's important  
17 to know which wells were pumping; right?

18 MS. BAUGHMAN: Objection.

19 Form.

20 THE WITNESS: Sometimes you  
21 don't know that information, so you  
22 have to make assumptions.

23 Q. BY MS. SILVERSTEIN: Do the  
24 wells impact the groundwater flow?

25 MS. BAUGHMAN: Objection.

1                   Form.

2                   THE WITNESS: Yes.

3                   Q.         BY MS. SILVERSTEIN: And if you  
4                   don't know that information, you're making  
5                   assumptions you said?

6                   MS. BAUGHMAN: Objection.

7                   Form.

8                   THE WITNESS: Yes.

9                   Q.         BY MS. SILVERSTEIN: But those  
10                  assumptions are not -- it's possible that  
11                  those assumptions are not accurate; right?

12                  MS. BAUGHMAN: Objection.

13                  Form.

14                  THE WITNESS: It's possible.

15                  Q.         BY MS. SILVERSTEIN: If you  
16                  turn to Page A19. Do you see Table A6?

17                  A.         Yes.

18                  Q.         And that is titled "Historical  
19                  operations for" -- Camp Lejeune -- "for water  
20                  supply wells, 1952 to 1987, Tarawa Terrace  
21                  and Vicinity, U.S. Marine Corps Base Camp  
22                  Lejeune, North Carolina"; right?

23                  A.         Yes.

24                  Q.         And you'd agree that this is --  
25                  this is all of the water supply wells that

1 served Tarawa Terrace?

2 A. I assume so.

3 Q. You're not aware of any water  
4 supply wells that served Tarawa Terrace that  
5 are not included in this table; correct?

6 A. Correct.

7 Q. If you look at TT-23?

8 A. Uh-huh.

9 Q. You'd agree that TT-23 was  
10 first in service in August 1984; right?

11 A. That's what it says.

12 Q. And that it was offline in  
13 February 1985; right?

14 A. That -- that's what it says.

15 Q. And you'd agree that TT-23, the  
16 service was terminated in May 1985?

17 A. I have no other information  
18 by -- except for what's presented.

19 Q. Okay. So based on what's  
20 presented, you would agree that TT-23's  
21 service was terminated in May 1985; correct?

22 A. Correct.

23 Q. And if you look at TT-25, you  
24 would agree that TT-25 was first in service  
25 in January 1982?

1           A.       That's what it says.

2           Q.       And that TT-25 service was  
3 terminated in March 1987; correct?

4           A.       As stated.

5           Q.       You would also agree that TT-26  
6 was offline July through August 1980 and  
7 January through February 1983?

8           A.       As it's recorded.

9           Q.       And you would agree that TT-26  
10 service was terminated in February 1985?

11          A.       As stated.

12           MS. SILVERSTEIN: I'm handing  
13 you Exhibit 7.

14 (Exhibit 7 was marked for identification.)

15          Q.       BY MS. SILVERSTEIN: I handed  
16 you Exhibit 7. The title here is "Analyses  
17 of Groundwater Flow, Contaminant Fate and  
18 Transport, and Distribution of Drinking Water  
19 at Tarawa Terrace and Vicinity, U.S. Marine  
20 Corps Base Camp Lejeune, North Carolina:  
21 Historical Reconstruction and Present-Day  
22 Conditions. Chapter C: Simulation of  
23 Groundwater Flow"; is that correct?

24          A.       Correct.

25          Q.       Okay. And you see in the

1 bottom corner -- right-hand corner on the  
2 first page the Bates is ending in 92939?

3 A. Correct.

4 Q. And this is -- you reviewed  
5 Chapter C in forming your opinions; right?

6 A. Yes.

7 Q. If you could turn to Page C25.  
8 It's -- the Bates ends in 92975.

9 Do you see --

10 A. Yes.

11 Q. -- that? And you see  
12 Table C10?

13 A. Uh-huh, yes.

14 Q. Table C10 is titled "Simulated  
15 and observed predevelopment water levels in  
16 wells and related statistics, Tarawa Terrace  
17 and vicinity, U.S. Marine Corps Base  
18 Camp Lejeune, North Carolina"; right?

19 A. Yes.

20 Q. And you agree that this is --  
21 this is ATSDR's table on the capacity and  
22 operational history of the listed wells?

23 MS. BAUGHMAN: Objection.

24 Form.

25 THE WITNESS: Capacity and

1                   operation?

2                   Q.         BY MS. SILVERSTEIN: What is  
3                   your understanding of what this table is?

4                   A.         To me, it looks like you have a  
5                   bunch of sites where you're measuring the  
6                   water level and simulating it, I assume, with  
7                   the groundwater model.

8                   Q.         Okay. Do you agree -- all  
9                   right. So I want you to look at both  
10                  Table A6 and Table C10.

11                  Do you have both of those  
12                  tables?

13                  A.         A6?

14                  Q.         Yes.

15                  A.         Okay. Hold on one second.

16                  MS. BAUGHMAN: What page was A6  
17                  on?

18                  THE WITNESS: It would be on  
19                  page....

20                  MS. SILVERSTEIN: It's A19.

21                  THE WITNESS: Okay. Okay.

22                  Q.         BY MS. SILVERSTEIN: I actually  
23                  pointed you to the wrong table in Chapter C.

24                  A.         No worries.

25                  Q.         So Table -- Ah. Is it your

1 understanding that the service termination  
2 dates between Chapter C and Chapter A should  
3 be the same?

4 MS. BAUGHMAN: Objection.

5 Form.

6 THE WITNESS: I'm not sure what  
7 tables you're referring to.

8 Q. BY MS. SILVERSTEIN: So we just  
9 looked at Table A6, which says when TT-23  
10 service was terminated; correct?

11 A. A6, yep.

12 Q. Okay.

13 A. That's correct.

14 Q. And in your experience, should  
15 the service termination date be consistent  
16 in -- across ATSDR's reports?

17 MS. BAUGHMAN: Objection.

18 Form. Foundation.

19 THE WITNESS: I assume.

20 Q. BY MS. SILVERSTEIN: If you go  
21 to Page A27 and look at Table A9?

22 MS. BAUGHMAN: When -- which --  
23 which document?

24 THE WITNESS: A -- Chapter A.

25 MS. BAUGHMAN: Okay.

1                   THE WITNESS: A -- what table?

2                   MS. SILVERSTEIN: A27. It's  
3                   Table A9.

4                   THE WITNESS: Okay.

5                   Q. BY MS. SILVERSTEIN: And this  
6                   is titled "Summary of model-derived values  
7                   and observed data of tetrachloroethylene at  
8                   water-supply wells, Tarawa Terrace, U.S.  
9                   Marine Corps Base Camp Lejeune,  
10                  North Carolina"; correct?

11                  A. Yes.

12                  Q. And would it be fair to say  
13                  that Table A9 summarizes paired, observed,  
14                  and model-simulated values of PCE at the  
15                  Tarawa Terrace water supply wells?

16                  A. Yes. Model-derived values and  
17                  observed values, correct.

18                  Q. Would you agree that from  
19                  January 1952 to December 1987, PCE was only  
20                  detected in TT-26, TT-23, and TT-25?

21                  MS. BAUGHMAN: Objection.

22                  Form.

23                  THE WITNESS: In which wells?

24                  26.

25                  Q. BY MS. SILVERSTEIN: 23 --

1 TT-23, TT-25, and TT-26.

2 A. What about TT-31? Or TT-54?

3 Q. Do you see Supply Well TT-31  
4 under the observed data?

5 A. Oh, not -- okay, nondetected.

6 Q. It's marked as nondetect;  
7 correct?

8 A. Okay. Yeah, based on -- oh,  
9 until '87; right?

10 Q. From 1951 -- January 1952 to  
11 December 1987, PCE was detected only in  
12 TT-23, TT-25, and TT-26; correct?

13 A. According to this table, that  
14 is correct.

15 Q. Are you aware of data showing  
16 that PCE was detected at any well other than  
17 TT-23, TT-25, or TT-26 from January 1952 to  
18 December 1987?

19 A. No.

20 Q. And you'd agree that the  
21 highest PCE detection in TT-23 was  
22 132 micrograms per liter in January 1985;  
23 correct?

24 A. Based on this table, correct.

25 Q. And you'd agree that PCE

1 detection -- that the only PCE detection in  
2 TT-25 was .43 micrograms per liter in  
3 September 1985?

4 MS. BAUGHMAN: Objection.

5 Form.

6 THE WITNESS: That's what it  
7 says.

8 Q. BY MS. SILVERSTEIN: Okay. Do  
9 you have any reason to believe that there is  
10 other data not included in --

11 A. No.

12 MS. BAUGHMAN: Objection.

13 Form. Foundation.

14 Were you limiting that to  
15 through 1987?

16 THE WITNESS: Yeah.

17 MS. SILVERSTEIN: Yes.

18 MS. BAUGHMAN: Okay. I just  
19 didn't hear you say that.

20 Q. BY MS. SILVERSTEIN: And you'd  
21 agree that the September 1985 results were  
22 after nondetects in both February 1985 and  
23 April 1985; correct?

24 A. Okay. Say -- ask -- can you  
25 ask that question again?

1           Q.        Oh, you said a minute ago that  
2       the -- that you agreed that the only PCE  
3       detection from January 1952 to December 1987  
4       in Supply Well TT-25 was .43 micrograms per  
5       liter in September 1985; right?

6           A.        Yes.

7           Q.        And you would agree that that  
8       test result came after nondetects in both  
9       February 1985 and April 1985?

10          A.        Based on this table, yes.

11          Q.        And you agree that TT-26 was  
12       the primary contributor of PCE contamination  
13       to the Tarawa Terrace water treatment plant?

14          A.        Yes.

15          Q.        You agree that the PCE  
16       concentration and the water distributed from  
17       the Tarawa Terrace water treatment plant had  
18       PCE concentrations lower than detected at  
19       TT-26; right?

20                   MS. BAUGHMAN: Objection.

21                   Form.

22                   THE WITNESS: That's my  
23       understanding.

24          Q.        BY MS. SILVERSTEIN: And you'd  
25       agree that when TT-26 shut down in

1       February 1985, PCE concentrations at the  
2 Tarawa Terrace water treatment plant would  
3 decrease?

4                     MS. BAUGHMAN: Objection.

5                     Form.

6                     THE WITNESS: I don't -- I  
7                     don't know if you have enough basis  
8                     for that.

9                     Q.        BY MS. SILVERSTEIN: Okay. Do  
10                  you disagree that the PCE concentrations at  
11                  the Tarawa Terrace water treatment plant  
12                  would significantly decrease?

13                  MS. BAUGHMAN: Objection.

14                  Form.

15                  THE WITNESS: You would -- you  
16                  would expect, but I don't know if you  
17                  can make that assumption.

18                  Q.        BY MS. SILVERSTEIN: You would  
19                  expect that they would decrease?

20                  A.        Yes.

21                  Q.        What information would you need  
22                  to be sure that the concentrations would  
23                  decrease?

24                  MS. BAUGHMAN: Objection.

25                  Form.

1                   THE WITNESS: Measured values.

2                   Q.         BY MS. SILVERSTEIN: I want to  
3 direct you to Page A18 with the Bates stamp  
4 ending 615669. And in the first half of  
5 those two sections of text at the bottom,  
6 about three lines up it starts "Once a well  
7 was put in service, it was assumed to operate  
8 continuously for modeling purposes" and it  
9 was -- "until it was permanently taken  
10 offline - the exception being temporary  
11 shutdowns for long-term maintenance. Breaks  
12 in continuous operations, such as those for  
13 Wells TT-26 and TT-53, are also shown in  
14 Figure A5 and are based on documented  
15 information detailing periods of maintenance  
16 for specific wells."

17                   Did I read that correctly?

18                   A.         Yes.

19                   Q.         So then it would be -- you  
20 would agree that ATSDR model, the Tarawa  
21 Terrace supply wells, by assuming the  
22 operate -- they operated continuously unless  
23 ATSDR found documentation that they were  
24 temporarily shut down for maintenance?

25                   A.         That's my understanding.

1           Q.        Okay. And you would agree that  
2        TT-26 and TT-23 were not modeled as  
3        contributing anything to the Tarawa Terrace  
4        water treatment plant after 1985; right?

5           A.        That's my understanding.

6           Q.        Okay. So ATSDR's Tarawa  
7        Terrace model is modeling contamination  
8        coming from wells other than TT-26 and TT-23  
9        after 1985?

10              MS. BAUGHMAN: Objection.

11              Form.

12              THE WITNESS: Can you repeat  
13        the question?

14              Q.        BY MS. SILVERSTEIN: Sure.

15              You would agree that ATSDR's  
16        Tarawa Terrace model is modeling  
17        contamination from wells other than TT-26 and  
18        TT-23 after 1985; right?

19              A.        Assuming that they're pumping,  
20        yes.

21              Q.        Assuming that what's pumping?

22              A.        That the other wells are  
23        pumping.

24              Q.        Regardless of whether the other  
25        wells are pumping, ATSDR was not modeling

1 contamination from TT-26 or TT-23 after 1985;  
2 right?

3 MS. BAUGHMAN: Objection.

4 Form.

5 THE WITNESS: That's my  
6 understanding.

7 Q. BY MS. SILVERSTEIN: So if  
8 ATSDR is modeling water contamination after  
9 1985, it would have to be from wells other  
10 than TT-26 and TT-23?

11 A. Yeah, it -- yes.

12 Q. You would also agree that the  
13 only other well where contamination was  
14 detected from 1953 to 1987 was TT-25?

15 A. Yes, based on that table.

16 Q. Go to Page A93.

17 Okay. Do you see the table  
18 here, "Appendix A2. Simulated  
19 tetrachloroethylene and its degradation  
20 byproducts in finished water, Tarawa Terrace  
21 water treatment plant, January 1951 to  
22 March 1987 and continued"; right?

23 A. Yes.

24 Q. You would agree that ATSDR  
25 modeled PCE concentrations in water -- the

1 water treatment plant as high as  
2 18 micrograms per liter; right?

3 MS. BAUGHMAN: Objection.

4 Form.

5 What time frame are you talking  
6 about?

7 Q. BY MS. SILVERSTEIN: During the  
8 modeled time period -- during the time period  
9 through December 1987, you would agree that  
10 ATSDR modeled PCE concentrations in the water  
11 treatment plant in 1987 as high as  
12 18 micrograms per liter?

13 MS. BAUGHMAN: Objection.

14 Form.

15 THE WITNESS: In 1987?

16 Q. BY MS. SILVERSTEIN: In 1987,  
17 just looking at the 1987 data, you would  
18 agree that ATSDR modeled PCE concentration in  
19 water -- in the water treatment plant as high  
20 as 18 micrograms per liter; right?

21 A. That -- that's what this table  
22 says.

23 Q. And that was based on a mixture  
24 of five wells?

25 MS. BAUGHMAN: Objection.

1                   Form.

2                   THE WITNESS: I would have to  
3                   go back and see, but I would -- I  
4                   would assume, yes.

5                   Q.         BY MS. SILVERSTEIN: In -- and  
6                   so that highest value in 1987 was  
7                   February 1987; right?

8                   A.         Correct.

9                   Q.         And it was 18.49 micrograms per  
10                  liter?

11                  A.         Correct.

12                  Q.         And you agree that in 1987, PCE  
13                  contamination was only found in TT-25?

14                  MS. BAUGHMAN: Objection.

15                  Form. Foundation.

16                  THE WITNESS: Based on the  
17                  tables that are listed here, that's  
18                  correct.

19                  Q.         BY MS. SILVERSTEIN: And that  
20                  contamination was less than 1 microgram per  
21                  liter?

22                  MS. BAUGHMAN: Objection.

23                  Form.

24                  THE WITNESS: Based on the  
25                  table that we looked at before.

1 Q. BY MS. SILVERSTEIN: And to  
2 your knowledge, that table includes the only  
3 sampling results from the Tarawa Terrace  
4 water treatment plant?

5 A. Based --

6 MS. BAUGHMAN: Objection.

7 Form. Foundation.

8 THE WITNESS: Based on the  
9 table, yes.

10 Q. BY MS. SILVERSTEIN: Based on  
11 the table, it includes all of the results;  
12 correct?

13 MS. BAUGHMAN: Objection.

14 Form.

15 THE WITNESS: Yes.

16 Q. BY MS. SILVERSTEIN: And you're  
17 not aware of any sampling results that are  
18 not included in that table?

19 A. I'm not aware, correct.

20 MS. SILVERSTEIN: I'm handing  
21 you Exhibit 8.

22 (Exhibit 8 was marked for identification.)

23 Q. BY MS. SILVERSTEIN: This -- I  
24 just handed you Exhibit 8. The title of  
25 Exhibit 8 is "Analyses of Groundwater Flow,

1       Contaminant Fate and Transport, and  
2       Distribution of Drinking Water at Tarawa  
3       Terrace and Vicinity, U.S. Marine Corps Base  
4       Camp Lejeune, North Carolina: Historical  
5       Reconstruction and Present-Day Conditions.  
6       Chapter F: Simulation of the Fate and  
7       Transport of Tetrachloroethylene (PCE) " ;  
8       right?

9           A.       Correct.

10          Q.       And the Bates in the lower  
11       right-hand corner ends with 93047?

12          A.       Correct.

13          Q.       And you reviewed Chapter F in  
14       preparing your reports?

15          A.       Correct.

16          Q.       If you could turn to Page F42.  
17       And the Bates on that page, if it's helpful  
18       to find, ends in 93100.

19          A.       Yep.

20          Q.       At the top of the page it says  
21       "Level 4 Calibration."

22                   Do you see where I'm looking?

23          A.       Yes.

24          Q.       And that -- that paragraph  
25       says -- or starts "The final stage of model

1 calibration employed a simple mixing  
2 (flow-weighted average) model to" -- "to  
3 compute PCE concentrations delivered to the  
4 Tarawa Terrace water treatment plant from all  
5 active water-supply wells and subsequently to  
6 the Tarawa Terrace water-supply network. For  
7 each stress period (month) of the simulation  
8 period (from January 1951 to December 1994),  
9 the PCE concentration simulated at each  
10 active water-supply well is weighted by the  
11 respective well discharge to compute a  
12 weighted-average PCE concentration. This  
13 weighted-average concentration was considered  
14 the monthly average PCE concentration  
15 delivered to the Tarawa Terrace water  
16 treatment plant. The results" -- yeah --  
17 "delivered to the Tarawa Terrace water  
18 treatment plant."

19 Did I read that correctly?

20 A. Yes.

21 Q. Is it your understanding that a  
22 well's discharge means the water coming out  
23 of the well?

24 A. Yes.

25 Q. And that -- and is it your

1 understanding that simple mixing  
2 flow-weighted average has no calculation  
3 simulating the physical processes whereby  
4 contaminants lost during storage treat- --  
5 contaminants are lost during storage,  
6 treatment, or distribution?

7 MS. BAUGHMAN: Objection.

8 Foundation. Form.

9 THE WITNESS: Correct.

10 Q. BY MS. SILVERSTEIN: And so you  
11 would agree that a simple mixing  
12 flow-weighted average doesn't include a  
13 calculation for volatilization?

14 A. Yes.

15 Q. Or for sorption?

16 A. Adsorption on what?

17 Q. Does it include a calculation  
18 for sorption?

19 MS. BAUGHMAN: Objection.

20 Form.

21 THE WITNESS: Sorption on what?

22 Q. BY MS. SILVERSTEIN: Of  
23 anything.

24 Do -- does it include sorption  
25 in the -- in the calculation?

1 MS. BAUGHMAN: Objection.

2 Form.

3 If it -- if it doesn't make  
4 sense to you, you can tell her that.

5 THE WITNESS: Yeah, that  
6 doesn't make sense.

7 Q. BY MS. SILVERSTEIN: Okay. And  
8 you're not aware of any other processes  
9 whereby contaminants are lost during storage,  
10 treatment, or distribution that are taken  
11 into account in the model; correct?

12 MS. BAUGHMAN: Objection.

13 Form.

14 THE WITNESS: No, I'm not  
15 aware.

16 Q. BY MS. SILVERSTEIN: So it  
17 would be correct to say that the ATSDR Tarawa  
18 Terrace model did not include a calculation  
19 simulating contaminant losses during storage,  
20 treatment, or distribution?

21 A. That's my understanding.

22 Q. You would agree that the ATSDR  
23 Tarawa Terrace model simulated PCE  
24 concentrations as equivalent to the mixture  
25 of water as if it was taken directly from the

1 wells without treatment or distribution?

2 MS. BAUGHMAN: Objection.

3 Form.

4 THE WITNESS: Can you repeat  
5 that question?

6 Q. BY MS. SILVERSTEIN: Sure.

7 You would agree that the ATSDR  
8 Tarawa Terrace model simulated PCE  
9 concentrations as if they were equivalent to  
10 the mixture of water taken directly from the  
11 wells without treatment or distribution?

12 MS. BAUGHMAN: Objection.

13 Form.

14 THE WITNESS: The -- the model  
15 simulated the extraction of the wells  
16 of that water that was delivered to  
17 the treatment plant. That's what the  
18 model simulated.

19 Q. BY MS. SILVERSTEIN: Okay.

20 Okay. I want to go back to Chapter A. If  
21 you go to -- go to Page A26.

22 And you see Table A8 at the  
23 top?

24 A. Uh-huh, yes.

25 Q. And Table A8 is titled "Summary

1       of calibration targets and resulting  
2       calibration statistics for simulation models  
3       used to reconstruct historical contamination  
4       events at Tarawa Terrace and vicinity, U.S.  
5       Marine Corps Base Camp Lejeune,  
6       North Carolina"; right?

7           A.       Yes.

8           Q.       And the second column is  
9       "Analysis type"?

10          A.       Yes.

11          Q.       And as you look at Calibration  
12       Level 3, it says the analysis type is  
13       contaminant fate and transport supply wells;  
14       right?

15          A.       Yes.

16          Q.       So you would agree that ATSDR  
17       calibrated the contaminant fate and transport  
18       at Tarawa Terrace with supply well  
19       measurements; right?

20          A.       Yes.

21          Q.       And that was the -- well, you  
22       would agree that the calibration target that  
23       ATSDR used was plus or minus one-half order  
24       of magnitude; right?

25          A.       That's what it says.

1           Q.        Okay.  And so the model bias  
2       was ranging from .3 -- they used a target of  
3       ranging from .3 to 3?

4           A.        Yes.

5           Q.        So then if you look at  
6       Chapter F on Page F33.  Do you see Table F13  
7       on the left-hand side?

8           A.        Yes.

9           Q.        That's the "Simulated and  
10      observed tetrachloroethylene (PCE)  
11      concentrations at water supply wells and  
12      calibration target range, Tarawa Terrace and  
13      vicinity, U.S. Marine Corps Base  
14      Camp Lejeune, North Carolina"; right?

15          A.        Yes.

16          Q.        And you'd agree that Table F13  
17      shows all of the supply well observed  
18      measurements that were used for calibration?

19          A.        That's my understanding, yes.

20          Q.        And you'd agree that the  
21      observed measurements are from 1984 and 1985  
22      and 1991?

23          A.        '85, and '91.  What was the  
24      other year you said?

25          Q.        1984.  Well, I guess you would

1 agree that the --

2 A. Where -- where do you see 1984?

3 Q. Sure.

4 You would agree that the  
5 observed measurements listed in this chart  
6 are from 1985 and 1991; right?

7 A. Based on this chart, yes.

8 Q. Which means the Tarawa Terrace  
9 model was not calibrated with any observed  
10 concentrations from 1953 to 1983, or 1984?

11 MS. BAUGHMAN: Objection. Form  
12 and foundation.

13 THE WITNESS: That's my  
14 understanding.

15 Q. BY MS. SILVERSTEIN: Okay. I  
16 want to turn now to your initial report,  
17 which I believe is Exhibit 2.

18 Do you have your report in  
19 front of you?

20 A. Yes.

21 Q. And all of your opinions  
22 related to Camp Lejeune are included in this  
23 report?

24 MS. BAUGHMAN: Objection.

25 Form.

1                   THE WITNESS: All of my  
2 opinions? Well, the opinions based on  
3 the work that we did, yes.

4                   Q.         BY MS. SILVERSTEIN: And you're  
5 not offering any opinions that are not  
6 included in this -- this report or your  
7 rebuttal report; correct?

8                   MS. BAUGHMAN: Objection.

9                   Form.

10                  THE WITNESS: That's correct.

11                  Q.         BY MS. SILVERSTEIN: If you  
12 could look at section -- or at Page 6-1.

13                  A.         Which page?

14                  Q.         6-1.

15                  A.         Oh, 6-1. Okay. Okay.

16                  Q.         This Page 6-1 has the heading  
17 "6 Conclusions"; correct?

18                  A.         Yes.

19                  Q.         Is this a complete list of all  
20 the opinions you offer in this case?

21                  MS. BAUGHMAN: Objection.

22                  Form.

23                  THE WITNESS: The -- those are  
24 the opinions that we offered in this  
25 report.

1 Q. BY MS. SILVERSTEIN: Okay. And  
2 if you could turn to Page 1-1 in your  
3 rebuttal report, which is Exhibit 3.

4 A. Okay.

5 Q. And that says "Summary of  
6 Opinions" on the top of that page; correct?

7 A. Yes.

8 Q. Are Pages 6-1 in your initial  
9 report and 1-1 in your rebuttal report, are  
10 those -- is that a complete list of the  
11 opinions that you'll -- you're offering in  
12 this case?

13 MS. BAUGHMAN: Objection.

14 Form.

15 We're not -- everything is in  
16 both reports. We're not limiting it  
17 to two pages.

18 Q. BY MS. SILVERSTEIN: Are there  
19 any opinions that are not listed on one of  
20 these two pages?

21 MS. BAUGHMAN: Objection.

22 Form.

23 THE WITNESS: I mean, both of  
24 these pages are summary pages, so we  
25 tried to capture our opinions on these

1           two pages, but...

2           Q.       BY MS. SILVERSTEIN: Okay. Are  
3       all of your reports and the -- or all of your  
4       opinions and the bases for your opinions  
5       listed in either your initial report or your  
6       rebuttal report?

7           THE WITNESS: Current --

8           MS. BAUGHMAN: Objection.

9           Form.

10           THE WITNESS: Currently, yes.

11           Q.       BY MS. SILVERSTEIN: What do  
12      you mean "currently"?

13           A.       All the opinions that we've  
14      formed so far are included in these two  
15      documents.

16           Q.       Are you planning to offer any  
17      additional opinions?

18           MS. BAUGHMAN: Objection.

19           Form.

20           THE WITNESS: I believe that we  
21      have the -- the ability, upon learning  
22      new information or at the request of  
23      our legal team, we could offer  
24      additional opinions in the future,  
25      but --

1 Q. BY MS. SILVERSTEIN: Are  
2 there --

3 A. -- right now -- right now, this  
4 is -- this is what we have.

5 Q. Are you aware of any opinions  
6 that you are working on that you may offer in  
7 the future?

8 MS. BAUGHMAN: Objection.

9 Form.

10 THE WITNESS: No.

11 Q. BY MS. SILVERSTEIN: Are there  
12 any opinions in either your initial report or  
13 your rebuttal report that you no longer agree  
14 with?

15 A. No.

16 Q. How long did it take you to  
17 conduct -- to model the Tarawa Terrace  
18 post-audit?

19 A. What do you mean?

20 Q. How many hours did you spend  
21 working on the Tarawa Terrace post-audit  
22 before completing your first report?

23 A. I would have to look it up.

24 Q. Do you have an estimate?

25 A. No.

1 Q. Did you spend more than  
2 100 hours working on the Tarawa Terrace  
3 post-audit before offering your first report?

4 MS. BAUGHMAN: Objection.

5 Form.

6 His hours are in the bills.

7 You already have that.

8 THE WITNESS: Yeah. Yeah, I  
9 would refer to my billing.

10 Q. BY MS. SILVERSTEIN: Okay. And  
11 you didn't start working on the Tarawa  
12 Terrace post-audit before September of 2024;  
13 correct?

14 A. Correct.

15 Q. Okay. I want to start with  
16 your initial report, Exhibit 2. You were  
17 asked to provide a post-audit of the  
18 groundwater flow and transport models  
19 developed by the ATSDR for Tarawa Terrace; is  
20 that correct?

21 A. Correct.

22 Q. Were you asked to do anything  
23 other than provide a post-audit and your  
24 opinions related to the post-audit?

25 A. No.

1           Q.       When we're talking about a  
2 groundwater model, is it fair to say that a  
3 groundwater model is a computer model  
4 simulating groundwater flow through an  
5 aquifer?

6                     MS. BAUGHMAN: Objection.

7                     Form.

8                     THE WITNESS: That could be one  
9 model.

10          Q.       BY MS. SILVERSTEIN: Is that  
11 the kind of model that you -- was involved  
12 in -- in your work for this case?

13          MS. BAUGHMAN: Objection.

14          Form.

15          THE WITNESS: There were --  
16 there were two models that we did --  
17 that we worked on.

18          Q.       BY MS. SILVERSTEIN: Okay. And  
19 what -- what are those two models?

20          A.       The groundwater flow model --

21          Q.       Okay.

22          A.       -- which was MODFLOW-based, and  
23 a groundwater flow fate and transport model  
24 which was MT3DMS-based.

25          Q.       Okay. And you would agree that

1       a groundwater model is a simplified version  
2       of reality?

3           A.       I wouldn't say -- use the word  
4       "simplified." I would say "represent." A  
5       model to represent -- to attempt to represent  
6       reality.

7           Q.       Okay. But you would agree that  
8       it doesn't perfectly represent reality?

9                  MS. BAUGHMAN: Objection.

10               Form.

11               THE WITNESS: Correct.

12           Q.       BY MS. SILVERSTEIN: It doesn't  
13       perfectly reproduce the subsurface  
14       conditions?

15                  MS. BAUGHMAN: Objection.

16               Form.

17               THE WITNESS: Correct.

18           Q.       BY MS. SILVERSTEIN: And you'd  
19       agree that that's because the groundwater  
20       model can't take into account everything that  
21       exists in the real world that affects the --  
22       the water?

23                  MS. BAUGHMAN: Objection.

24               Form.

25               THE WITNESS: Correct.

1 Q. BY MS. SILVERSTEIN: Generally  
2 speaking, would it be correct to say that a  
3 groundwater model is an approximation of a  
4 complex field situation?

5 MS. BAUGHMAN: Objection.

6 Form.

7 THE WITNESS: Approximation?

8 Sure.

9 MS. SILVERSTEIN: I'm handing  
10 you Exhibit 9.

11 (Exhibit 9 was marked for identification.)

12 Q. BY MS. SILVERSTEIN: I handed  
13 you Exhibit 9, which is an article titled  
14 "Predictive Accuracy of a Ground-Water Model  
15 - Lessons from a Postaudit."

16 Do you see that?

17 A. Yes.

18 Q. And the author is Leonard  
19 F. Konikow?

20 A. Yes.

21 Q. Do you recognize the author's  
22 name?

23 A. Yes.

24 Q. And you're aware that  
25 Dr. Konikow is an expert retained by the

1 plaintiffs in this litigation?

2 A. Yes.

3 Q. Would you agree that  
4 Dr. Konikow is an expert in the field of  
5 hydrologic modeling?

6 A. Yes.

7 Q. Have you read this study  
8 before?

9 A. I don't believe so.

10 Q. I want to direct you to  
11 Page 183. At the bottom of Page 183, it says  
12 "An aquifer-simulation model is no more than  
13 an approximation of a complex field" --

14 MS. BAUGHMAN: Where are you --  
15 I'm sorry. Where are you reading  
16 from?

17 THE WITNESS: Just the bottom  
18 of --

19 MS. SILVERSTEIN: The bottom  
20 paragraph --

21 THE WITNESS: Bottom left --  
22 left side.

23 MS. SILVERSTEIN: -- on the  
24 left side.

25 Q. I'll start again.

1               It says "An aquifer-simulation  
2 model is no more than an approximation of a  
3 complex field situation. Improvements in  
4 the" -- "in the approximation are always  
5 possible; thus, models should be considered  
6 as dynamic representations of nature, subject  
7 to further refinement and improvement. As  
8 new information becomes available, previous  
9 forecasts could and should be modified."

10               Did I read that correctly?

11               A.       Yes.

12               Q.       Do you agree that models can  
13 and should be modified when new information  
14 becomes available?

15               MS. BAUGHMAN: Objection. Form  
16 and foundation.

17               He hasn't read this article.

18               He doesn't understand the context.

19               You want him to read the  
20 article first?

21               MS. SILVERSTEIN: Nope.

22               Q.       Do you agree with that, when  
23 you learn new information, a modeler should  
24 revise the model?

25               MS. BAUGHMAN: Objection.

1                   Form.

2                   THE WITNESS: You could.

3                   Doesn't -- it's not -- it's not a  
4                   requirement, if that's what you're  
5                   asking.

6                   Q.         BY MS. SILVERSTEIN: So as new  
7                   information becomes available, in your  
8                   opinion, it's okay for modelers to not  
9                   consider that information in the model?

10                  MS. BAUGHMAN: Objection.

11                  Form.

12                  THE WITNESS: They can consider  
13                  it. I -- I would -- I look on this  
14                  and say -- and Lenny says that they  
15                  could be modified.

16                  Q.         BY MS. SILVERSTEIN: And he  
17                  also says that they should be modified;  
18                  correct?

19                  A.         Sure.

20                  Q.         You can go ahead and set that  
21                  exhibit aside.

22                  The goal of your post-audit for  
23                  Tarawa Terrace was to extend the range of the  
24                  groundwater flow and transport model from  
25                  1995 to 2008; right?

1           A.        Correct.

2           Q.        Did you evaluate any data  
3       mining techniques that ATSDR used in their  
4       Tarawa Terrace groundwater flow and transport  
5       model?

6           A.        Such as?

7           Q.        Did you evaluate any of them?

8           A.        Data mining techniques?

9           Q.        Did you evaluate how ATSDR  
10      determined the parameters of the Tarawa  
11      Terrace model?

12                  MS. BAUGHMAN: Objection.

13                  Form.

14                  THE WITNESS: We -- we read the  
15      reports.

16           Q.        BY MS. SILVERSTEIN: You read  
17      Chapters A, C, and F; is that correct?

18           A.        Correct.

19           Q.        And those are the only chapters  
20      that you reviewed; correct?

21           A.        Correct.

22           Q.        Did you review the conceptual  
23      model created by ATSDR?

24                  MS. BAUGHMAN: Objection.

25                  Form.

1                   THE WITNESS: To the extent  
2                   that they were specified in those  
3                   reports.

4                   Q.         BY MS. SILVERSTEIN: Did you  
5                   note any flaws in ATSDR's conceptual model?

6                   MS. BAUGHMAN: Objection.

7                   Form.

8                   THE WITNESS: No.

9                   Q.         BY MS. SILVERSTEIN: If you had  
10                  noted flaws in the conceptual model, would  
11                  that change any of your opinions?

12                  MS. BAUGHMAN: Objection.

13                  Form.

14                  THE WITNESS: We were asked to  
15                  extend the model, not critique the --  
16                  the model.

17                  Q.         BY MS. SILVERSTEIN: Did you  
18                  evaluate ATSDR's selection of boundary and  
19                  initial conditions for their model?

20                  A.         Only to the extent of reading  
21                  the reports.

22                  Q.         Did you evaluate their  
23                  calibration process?

24                  A.         Only to become familiar with  
25                  what they did.

1           Q.       Did you evaluate ATSDR's  
2 sensitivity analysis?

3           A.       Only to the extent of what they  
4 reported.

5                   MS. SILVERSTEIN: I'm handing  
6 you Exhibit 10.

7 (Exhibit 10 was marked for identification.)

8           Q.       BY MS. SILVERSTEIN: I handed  
9 you Exhibit 10, which has the Bates stamp  
10 ending on the bottom right-hand side of the  
11 first page ending in 486488.

12                  Have you seen this document  
13 before?

14           A.       No.

15           Q.       Are you aware of who Thomas  
16 Sinks is?

17           A.       No.

18           Q.       And are you -- were you aware  
19 that the Navy critiqued the ATSDR Tarawa  
20 Terrace model?

21                  MS. BAUGHMAN: Objection.

22                  Form.

23                  Aware as of when?

24           Q.       BY MS. SILVERSTEIN: Prior to  
25 submitting your initial report, were you

1 aware that the Navy critiqued the ATSDR  
2 Tarawa Terrace report?

3 A. I would assume so. I -- I'm --  
4 I've not seen this document. I did not read  
5 any critiques. I assumed that -- that it  
6 existed.

7 Q. Okay. So since you didn't  
8 review any critiques prior to finalizing your  
9 initial report, you didn't consider any  
10 critiques from the Navy in your post-audit;  
11 correct?

12 MS. BAUGHMAN: Objection.  
13 Form.

14 THE WITNESS: Correct.

15 Q. BY MS. SILVERSTEIN: Is it your  
16 understanding that ATSDR performed a  
17 sensitivity analysis to determine the  
18 relative importance of individual model  
19 parameters?

20 A. Can you ask that question  
21 again?

22 Q. Sure.

23 If you could go to the page  
24 ending in the Bates 6492.

25 A. Okay.

1           Q.       And looking at the bottom  
2 paragraph, it says "The ATSDR performed a  
3 sensitivity analysis to determine the  
4 relative importance of individual model  
5 parameters"; right?

6           A.       Yes.

7           Q.       And then two sentences after  
8 that it says "The model was run 840 times to  
9 produce 'realizations' that form a  
10 distribution of simulated PCE concentrations,  
11 rather than a single result"; right?

12          A.       Yes.

13          Q.       And you're aware that certain  
14 combinations of input parameters resulted in  
15 wells drying out?

16                 MS. BAUGHMAN: Objection.

17                 Form. Foundation.

18                 THE WITNESS: That's what it  
19 says here.

20          Q.       BY MS. SILVERSTEIN: What does  
21 it mean when the input parameters result in  
22 the wells drying out?

23          A.       Typically in a groundwater flow  
24 model, if you -- if the parameters like  
25 hydraulic connectivity and storage are such

1       that you try to pump water, that -- that well  
2       can go dry.

3           Q.        Okay. This happened in 330 out  
4       of the 840 realizations that ATSDR did?

5           MS. BAUGHMAN: Objection. Form  
6       and foundation.

7           THE WITNESS: Based on what  
8       they -- what they wrote, yes.

9           Q.        BY MS. SILVERSTEIN: Which made  
10      those realizations not viable; correct?

11           MS. BAUGHMAN: Same objections.

12           THE WITNESS: It could. Not  
13      necessarily. I mean, again, I'm  
14      not -- I know what they did. I don't  
15      know why they made the decision to not  
16      use those.

17           Q.        BY MS. SILVERSTEIN: Right.  
18      And you're -- is it your understanding that  
19      none of the wells, in reality, dried out?

20           A.        I don't know that.

21           Q.        Okay. The details of the  
22      sensitivity analysis were in Tarawa Terrace's  
23      Chapter I. You didn't review Chapter I;  
24      correct?

25           A.        That is correct.

1 Q. Why not?

2 A. We weren't provided that  
3 document from the legal team, I believe.

4 Q. Did you review ATSDR's  
5 uncertainty analysis?

6 A. No.

7 Q. We've been talking about ATSDR  
8 doing a hindcasting model. Would it be  
9 accurate to say that a hindcasting model is  
10 attempting to recreate something that  
11 happened in the past?

12 A. Correct.

13 Q. ATSDR didn't do a forecasting  
14 model; right?

15 A. That's my understanding.

16 Q. A forecasting model would take  
17 data and assumptions and predict the movement  
18 of contaminants in the water system into the  
19 future?

20 A. Correct.

21 Q. For the ATSDR's model, they use  
22 MT3DMS to model PCE in the -- Tarawa  
23 Terrace's water system; right?

24 A. Correct.

25 Q. They used TechFlowMP -- you're

1 aware that they used TechFlowMP to model the  
2 PCE degradation byproducts; right?

3 A. I'm aware of that.

4 Q. And that means they used  
5 TechFlowM3 [sic] to model TCE, vinyl  
6 chloride, and DCE; right?

7 A. That's my understanding.

8 Q. Your post-audit was of the  
9 MT3DMS portion of the Tarawa Terrace  
10 modeling; right?

11 A. Correct.

12 Q. And so you didn't look at the  
13 degradation of PCE into other byproducts;  
14 right?

15 A. That's correct.

16 Q. So you'd agree that you have no  
17 opinion on whether TechFlowMP's model of the  
18 PCE degradation byproducts is reliable?

19 A. I have no opinion.

20 Q. You're -- in your initial  
21 report, you said that after extending the  
22 19- -- the model from 1995 to 2008, you  
23 compared the output of the transport model  
24 with the concentrations sampled at monitoring  
25 wells during the 1995 to 2008 time period; is

1       that right?

2           A.       Say -- say that again.

3           Q.       Sure. After you extended the  
4       model from 1995 to 2008, you then compared  
5       the output of that extended model to the  
6       sampling data during that same time period,  
7       1995 to 2008; right?

8           A.       Yes.

9           Q.       And you did that to assess the  
10      performance of the model as an interpretive  
11      and predictive tool?

12                  MS. BAUGHMAN: Objection.

13                  Form.

14                  THE WITNESS: No, not -- not a  
15      predictive tool.

16           Q.       BY MS. SILVERSTEIN: Okay. And  
17      what do you mean that you did it to assess  
18      the performances of the model as an  
19      interpretive tool?

20           A.       Can you show me where I said  
21      that?

22           Q.       Sure. Well, so did you extend  
23      it for -- did you -- what kind of analysis  
24      did you perform on the model after extending  
25      it from 1995 to 2008?

1           A.       Well, I mean, that's all  
2 contained in the post-audit. We -- basically  
3 we looked at the -- we looked at the computed  
4 numbers at the observation points of  
5 comparing the computed versus the observed.

6           Q.       Okay. And did you compare the  
7 computed versus the observed in order to see  
8 how the model performed?

9           A.       Correct.

10          Q.       And would it -- would you agree  
11 that if the model matched sample  
12 concentrations closely, then the model's more  
13 likely to be accurate?

14                 MS. BAUGHMAN: Objection.

15                 Form.

16                 THE WITNESS: Correct.

17          Q.       BY MS. SILVERSTEIN: Okay. If  
18 the model didn't match observed  
19 concentrations closely, there was a big  
20 difference between the values, would it mean  
21 that the simulated model is less likely to be  
22 accurate?

23                 MS. BAUGHMAN: Objection.

24                 Form.

25                 THE WITNESS: You could

1           probably make that -- you could  
2           probably make that case.

3           Q.       BY MS. SILVERSTEIN: So I want  
4           to talk a little bit about the data that was  
5           available for you, but I want to start with  
6           what kind of -- what types of data do you  
7           consider necessary to do a historical  
8           reconstruction?

9           MS. BAUGHMAN: Objection.  
10           Form.

11           THE WITNESS: I would look for  
12           as much information as I could get.

13           Q.       BY MS. SILVERSTEIN:  
14           Information about what?

15           A.       The groundwater -- the  
16           groundwater -- the -- the aquifer  
17           characteristics, pumping, recharge, the  
18           boundary conditions that you would use; you  
19           know, all of the parameters that would go  
20           into the model.

21           Q.       Okay. And would it be fair to  
22           say that if you had the values for input  
23           parameters that were specific to the site you  
24           were modeling, that would make the historical  
25           reconstruction more accurate?

1 MS. BAUGHMAN: Objection.

2 Form.

3 THE WITNESS: It would help.

4 Q. BY MS. SILVERSTEIN: Is a  
5 historical reconstruction model a hindcasting  
6 model? Are they the same thing?

7 A. Yes, I would say -- I would say  
8 so.

9 Q. So if I use them  
10 interchangeably --

11 A. Sure.

12 Q. -- we can assume that we're  
13 talking about --

14 A. Sure.

15 Q. -- the same kind of modeling  
16 work?

17 A. Sure.

18 MS. SILVERSTEIN: Okay. We've  
19 been going for over an hour. I think  
20 this would be a good time to take a  
21 break.

22 THE WITNESS: That's fine.

23 THE VIDEOGRAPHER: We're off  
24 the record. The time is 11:44.

25 (The lunch break was taken from

1                   11:44 p.m. until 12:56 p.m.)

2                   THE VIDEOGRAPHER: We're back  
3                   on the record. The time is 12:56.  
4                   This is Media Number 3.

5                   Counsel may proceed.

6                   Q.         BY MS. SILVERSTEIN: Hi again,  
7                   Mr. Davis.

8                   Did you -- while we were on the  
9                   lunch break just now, did you speak with your  
10                  attorneys about the substance of your  
11                  testimony?

12                  A.         Yes. They told me I was doing  
13                  a good job.

14                  Q.         Did they talk to you about the  
15                  questions that I was asking or what your  
16                  responses should be?

17                  A.         No.

18                  Q.         Is there anything that you  
19                  answered earlier that you'd like to change?

20                  A.         No.

21                  Q.         If you could go ahead and pull  
22                  up Exhibit 2, which is your initial report.  
23                  I think it's the one that's open right there.

24                  A.         Yeah.

25                  Q.         A lot of documents.

1           A.       It's okay.

2           Q.       And if you could turn to the  
3       Executive Summary.

4                   All right. So then on the  
5       second page of the executive summary, you  
6       said "Despite the inherent challenges in  
7       simulating complex subsurface conditions and  
8       dealing with incomplete data, the model  
9       effectively simulates long-term trends and  
10      contaminant migration."

11                  What are the inherent  
12      challenges in simulating complex subsurface  
13      conditions?

14                  A.       I would say the main challenge  
15      is you never have enough data, and  
16      particularly with transport models, the  
17      heterogeneities, the differences in the  
18      subsurface, make it complex and make it  
19      challenging.

20                  Q.       You also said "dealing with  
21      incomplete data." What do you mean by  
22      "dealing with incomplete data"?

23                  A.       As I just said, you always want  
24      more data, and so since there's this desire  
25      to have more data, the data that you have is

1       incomplete.

2           Q.        What's the effect -- how does  
3       dealing with incomplete data affect your  
4       modeling work?

5           MS. BAUGHMAN: Objection.

6       Form.

7           THE WITNESS: It -- it -- well,  
8       as I said, the more data you have, the  
9       more confidence you have in the model.

10          Q.        BY MS. SILVERSTEIN: How  
11       much -- in your opinion, how much data do you  
12       need to accurately --

13          A.        That's --

14          Q.        -- do a model?

15          MS. BAUGHMAN: Wait until she  
16       finishes.

17           You were done?

18           I'm going to object to the  
19       form.

20           THE WITNESS: Okay. Yeah,  
21       that's -- that's completely  
22       subjective. It's never enough, and  
23       there's -- there's not a definition  
24       written, oh, this is -- this is  
25       sufficient.

1 Q. BY MS. SILVERSTEIN: In your  
2 personal experience, is there an amount of  
3 data that, you know, if you have less than  
4 that amount of data, you can't confidently do  
5 a water model?

6 MS. BAUGHMAN: Objection.

7 Form.

8 THE WITNESS: No.

9 MS. SILVERSTEIN: I am handing  
10 you Exhibit 11.

11 (Exhibit 11 was marked for identification.)

12 Q. BY MS. SILVERSTEIN: This is  
13 Exhibit 11, and on the first page it says  
14 "The" -- ground book -- or "The Handbook" --  
15 excuse me -- "of Groundwater Engineering,  
16 Editor-in-Chief Jacques W. Delleur."

17 Do you see that?

18 A. Yes.

19 Q. And if you go to the first  
20 page, that says "20 Groundwater Modeling"  
21 with -- the author is Leonard F. Konikow and  
22 Thomas E. Reilly.

23 Do you see that?

24 A. Yes.

25 Q. Have you reviewed this book,

1       The Handbook of Groundwater Engineering,  
2 before?

3           A.       No.

4           Q.       If you could turn to  
5 Section 20.6.8.

6           A.       How old is this book? 1999,  
7 okay. Excuse me, what page?

8           Q.       20.6.8. The page says 20-26 at  
9 the top.

10                  Are you at Section 20.6.8?

11           A.       Yeah.

12           Q.       And that section is titled  
13 "Predictions and Postaudits"; right?

14           A.       Yes.

15           Q.       And it says -- the first  
16 paragraph, it starts "As model calibration  
17 and parameter estimation are keyed to a set  
18 of historical data, the confidence in and  
19 reliability of the calibration process is  
20 proportional to the quality and  
21 comprehensiveness of the historical record."

22                  Do you agree with that?

23                  MS. BAUGHMAN: Objection.

24                  Form.

25                  THE WITNESS: Yes, but, you

1 know, they use the word  
2 "proportional," so that -- that word  
3 "proportional" could vary widely.

4 Q. BY MS. SILVERSTEIN: Okay.

5 Would you agree that the more historical data  
6 a modeler has, the more reliable the model  
7 is?

8 MS. BAUGHMAN: Objection.

9 Form.

10 THE WITNESS: It's -- it's  
11 helpful in -- in giving you more  
12 confidence.

13 Q. BY MS. SILVERSTEIN: More  
14 confidence that the model is a better  
15 representation of real-world conditions?

16 MS. BAUGHMAN: Objection.

17 Form.

18 THE WITNESS: No. More  
19 confidence in reducing the  
20 uncertainty.

21 Q. BY MS. SILVERSTEIN: And so,  
22 similarly, would that mean that the less  
23 historical data that's available, the less  
24 confident you can be in a model?

25 MS. BAUGHMAN: Objection.

1                   Form.

2                   THE WITNESS: Could be. I  
3                   mean, I guess what I wanted -- what I  
4                   wanted to add is just having more data  
5                   doesn't necessarily make the model  
6                   more accurate.

7                   Q.         BY MS. SILVERSTEIN: Why is  
8                   that?

9                   A.         Because you -- you may not --  
10                  the -- you could have additional data that  
11                  wouldn't require changes to the model, and if  
12                  you don't make any changes to the model, then  
13                  you're going to get the same results.

14                  Q.         Okay. The last sentence in  
15                  that paragraph is "A reasonable guideline is  
16                  to predict only for a time comparable to the  
17                  period that was matched."

18                  A.         Okay. Let's see here.

19                  MS. BAUGHMAN: And you can feel  
20                  free to read as much of this as you  
21                  want since you've never read this  
22                  chapter.

23                  THE WITNESS: "The original  
24                  guideline is to predict only" --

25                  MS. BAUGHMAN: Don't read out

1           loud, okay?

2           THE WITNESS: Okay. Sorry.

3           MS. BAUGHMAN: I'll object to  
4           the form.

5           THE WITNESS: Okay. What --  
6           what's the question?

7           Q.       BY MS. SILVERSTEIN: What is  
8           your understanding of what it means that "A  
9           reasonable guideline is to predict only for a  
10          time comparable to the period that was  
11          matched"?

12           MS. BAUGHMAN: Objection.  
13           Form.

14           He didn't write it.

15           THE WITNESS: Yeah, I'm -- I'm  
16          not sure what that sentence means.

17           Q.       BY MS. SILVERSTEIN: Do you  
18          have any understanding, reading that today?

19           MS. BAUGHMAN: Objection.  
20           Form.

21           THE WITNESS: No.

22           MS. SILVERSTEIN: Okay. You  
23          can go ahead and put that exhibit  
24          aside.

25           Q.       One of the pieces -- the types

1       of data that you used in your post-audit is  
2 precipitation values; right?

3           A.        Correct.

4           Q.        And you agree that the original  
5 model used precipitation values from  
6 Maysville-Hofmann Forest Station; right?

7           A.        That's my understanding.

8           Q.        For the post-audit, you  
9 attempted to obtain precipitation data from  
10 Maysville-Hofmann Forest Station; right?

11          A.        Correct.

12          Q.        Why did you first -- why did  
13 you try and attempt to -- attempt to obtain  
14 data from Maysville-Hofmann Forest Station?

15          A.        Made sense to use the same  
16 source.

17          Q.        Why would it make sense to use  
18 the same source?

19                   MS. BAUGHMAN: Objection.

20                   Form.

21                   THE WITNESS: It just -- it  
22 just makes sense if they -- if they  
23 used -- if they got data from one  
24 source, there would be no reason,  
25 unless that data did not exist, to use

1           some other source.

2           Q.       BY MS. SILVERSTEIN: Okay.

3       When you attempted to obtain this data, you  
4       discovered there were three data sets from  
5       Maysville-Hofmann Forest Station; right?

6           A.       I just recall that the -- for  
7       the -- for the years that we were looking  
8       for, the original source wasn't complete.

9           Q.       When you say "original  
10      source" --

11          A.       Where they -- where they got  
12       the -- the precipitation from for the  
13       original model.

14          Q.       Okay. For the post-audit --  
15       and I'm on Page 3-1, under Section 3.2  
16       "Rainfall-Recharge."

17          A.       Correct.

18          Q.       You found -- it says "We found  
19       three different precipitation data sets that  
20       were purported to be from the Hoffmann Forest  
21       Station, but each of these data sets was  
22       determined to be unusable"; is that right?

23          A.       Yeah, incomplete.

24          Q.       Why did you determine that the  
25       data was unusable?

1           A.       Incomplete.

2           Q.       What do you mean by  
3 "incomplete"?

4           A.       Missing data.

5           Q.       Meaning that there were time  
6 periods that there was no data for?

7           A.       Correct.

8           Q.       Since you determined the  
9 Hoffmann Forest Station data was unusable,  
10 you used data from other nearby stations;  
11 right?

12          A.       Correct.

13          Q.       And you said the mean rainfall  
14 for each of these gauges over the 1951 to  
15 1994 period is similar to the mean rainfall  
16 for the Hoffmann Forest Station over the same  
17 period?

18          A.       Correct.

19          Q.       Did you determine whether the  
20 mean rainfall for each of the -- the other  
21 stations that you used from 1995 to 2008 was  
22 similar to the mean rainfall for Hoffmann  
23 Forest Station during that time period?

24          A.       That was difficult because that  
25 data was incomplete.

1           Q.        Okay.  Was the data for  
2 Hoffmann Forest Station from 1951 to 1994  
3 complete?

4           A.        I assume that it was because  
5 that's what was used in the model.

6           Q.        Did you do anything to confirm  
7 whether or not that data was complete?

8           A.        No.  We based -- we just -- we  
9 looked -- we -- we reviewed what -- the  
10 documentation here, and then -- then they  
11 reported those monthly recharge values in --  
12 in that model, and so that's what we --  
13 that's what we were based on -- we were  
14 basing it on, not the original raw data.  We  
15 had no access to the original raw data that  
16 they had.

17          Q.        Okay.  So where did you get the  
18 precipitation data for Hoffmann Forest  
19 Station from 1995 to 2008?

20          A.        We requested it from various --  
21 North Carolina State and various -- various  
22 location -- various organizations to try to  
23 get that data for that period of time.

24          Q.        Did you --

25          A.        And nobody had complete data.

1           Q.        Okay. Did you request the data  
2        for Hoffmann Forest Station from those same  
3        sources for 1951 to 1994?

4           A.        No.

5           Q.        It's correct that you used the  
6        precipitation values to calculate the  
7        recharge coefficient; right?

8           A.        The recharge rate.

9           Q.        The recharge rate, okay.  
10                  And you used .235 as the  
11        recharge rate?

12           A.        Yeah. That was the same that  
13        was used in the original model.

14           Q.        And my understanding is the  
15        recharge rate is equal to the average  
16        effective recharge divided by the average  
17        annual precipitation; is that right?

18           A.        Say that again.

19           Q.        That to get the recharge rate,  
20        you do the average effective recharge divided  
21        by the average annual precipitation; is that  
22        right?

23           A.        No.

24           Q.        How do you get --

25           A.        No. You're going to get --

1 Q. -- the recharge rate?

2 A. You're going to get -- you're  
3 going to get monthly recharge -- or monthly  
4 precipitation numbers --

5 Q. Okay.

6 A. -- and you're going to multiply  
7 by this factor, and that's the amount of  
8 water that's applied to the model, that goes  
9 into the model.

10 Q. Okay. So you say you're going  
11 to multiply that by this factor. Are you  
12 referring to the .235?

13 A. Correct.

14 Q. How do you determine that  
15 recharge rate? Like, how do you determine  
16 the .235?

17 A. That was given to us by the  
18 legal team. That was what was used in the  
19 original model. So to be consistent, we used  
20 the same. There was no -- there was no  
21 reason that the -- that that rate had  
22 changed. That factor, I should say.

23 Q. Okay. And do you know how  
24 ATSDR determined that factor?

25 A. No.

1           Q.       So would it be fair to say that  
2 you didn't do anything to confirm that  
3 ATSDR's factor was correct?

4           A.       No.

5           Q.       No, you didn't do anything to  
6 confirm or, no, that's not correct?

7           A.       That was outside of our scope.

8           Q.       Okay. You also considered  
9 remediation well pumping data for your  
10 post-audit; right?

11          A.       Considered?

12          Q.       Did you use the remediation  
13 well pumping data?

14          A.       Correct.

15          Q.       My understanding is that the  
16 remediation wells withdraw water from the  
17 aquifer; is that right?

18          A.       That's correct.

19          Q.       And is it correct that  
20 withdrawing water from the aquifer is  
21 impacted -- impacts -- excuse me -- both the  
22 flow field and the subsequent movement of  
23 contaminants simulated by MT3DMS?

24          A.       Correct.

25          Q.       And you'd agree that inaccurate

1 remediation well data would affect the model  
2 results; right?

3 MS. BAUGHMAN: Objection.

4 Form.

5 THE WITNESS: Affect it in  
6 which way?

7 Q. BY MS. SILVERSTEIN: If you  
8 found out that the remediation -- that  
9 remediation well data was inaccurate, could  
10 that change the results of the post-audit?

11 MS. BAUGHMAN: Objection.

12 Form.

13 THE WITNESS: Change the  
14 results of the post-audit? Like,  
15 which results are we talking about?

16 Q. BY MS. SILVERSTEIN: Could it  
17 change the concentration data produced by  
18 MT3DMS?

19 A. It's possible.

20 MS. BAUGHMAN: Objection.

21 Form.

22 THE WITNESS: It's possible.

23 Q. BY MS. SILVERSTEIN: And --  
24 okay. In your report, you said that you  
25 received a list of remediation wells and

1 pumping history for 1999 to 2008; is that  
2 right?

3 A. I believe that's correct.

4 Q. Where did you get that list of  
5 pumping -- pumping well history from?

6 A. From the legal team.

7 Q. Do you know what the source of  
8 that data is?

9 A. No.

10 Q. When I say "the pumping  
11 history," that includes, like, the pumping  
12 rate data; right?

13 A. That's correct.

14 Q. And in your report, you say you  
15 have a list of remediation wells and pumping  
16 history for 1999 to 2008.

17 Does that mean that you did not  
18 have remediation well pumping history from  
19 1995 to 1998?

20 A. I believe there's a table that  
21 lists -- yeah, Table 2 lists the information  
22 that we were given for the five remediation  
23 wells pumping from 1995 -- well, our model  
24 went from 1995 to 2008, and we were given  
25 this data that's reflected in Table 2.

1           Q.        Okay.  And Table 2 reflects  
2 pumping rate data from November 1999 through  
3 March 2008; right?

4           A.        Correct.

5           Q.        So there's -- you weren't  
6 provided pumping rate data for 1995 through  
7 1998; right?

8                   MS. BAUGHMAN: Objection. Form  
9 and foundation.

10          Q.        BY MS. SILVERSTEIN: Were you  
11 provided any pumping rate data for 1995?

12          A.        No.

13          MS. BAUGHMAN: Same objection.

14          Q.        BY MS. SILVERSTEIN: Were you  
15 provided pumping rate data for 1996?

16          MS. BAUGHMAN: Same objection.

17          THE WITNESS: No.

18          Q.        BY MS. SILVERSTEIN: Were you  
19 provided pumping rate data for 1997?

20          MS. BAUGHMAN: Same objections.

21          THE WITNESS: No.

22          Q.        BY MS. SILVERSTEIN: And were  
23 you provided any pumping rate data for 1998?

24          MS. BAUGHMAN: Same objections.

25          THE WITNESS: No.

1 Q. BY MS. SILVERSTEIN: The  
2 pumping rate data that you do have -- well,  
3 first, did you prepare Table 2?

4 A. My staff did, yes.

5 Q. And you said a minute ago that  
6 this is all of the pumping rate data that you  
7 have; is that correct?

8 A. That's correct.

9 Q. This data is for five different  
10 remediation wells?

11 A. Correct.

12 Q. And you have, looks like, eight  
13 data points for each well; is that correct?

14 A. Correct.

15 Q. So would it be accurate to say  
16 that you have data points for five wells for  
17 eight days over a 13-year time span?

18 MS. BAUGHMAN: Objection.

19 Form.

20 THE WITNESS: Five wells,  
21 eight -- some of them didn't have, so  
22 you couldn't say, you know, because  
23 RWS-1A did not have any -- was not  
24 pumping in 2007 -- on February 20,  
25 2007, and March 11, 2008, so this

1           table reflects what we were given and  
2           what we put in the model.

3           Q.        BY MS. SILVERSTEIN: Okay. I  
4           want to talk a little bit about some of the  
5           assumptions that you made with the  
6           remediation well data.

7           A.        Okay.

8           Q.        So looking at this table, the  
9           data points show that the pumping rate  
10          changed for each well over time; right?

11          A.        (Witness nods head.)

12          Q.        I'm sorry, is that a yes?

13          A.        Yes, yes.

14          Q.        Sorry, I just have to ask for  
15          the answers to be verbal.

16          A.        Yeah.

17                   MS. BAUGHMAN: Objection.

18                   Form.

19                   It's actually not true.

20                   THE WITNESS: Yeah, I was -- I  
21                  apologize. I wasn't -- I didn't wait  
22                  for your question, so if you can ask  
23                  the question again.

24          Q.        BY MS. SILVERSTEIN: Sure.

25                   The table shows that the

1 pumping rate for the wells changed over time;  
2 right?

3 MS. BAUGHMAN: Objection.

4 Form.

5 THE WITNESS: Yes.

6 Q. BY MS. SILVERSTEIN: Okay. And  
7 you'd agree that in between the data points,  
8 you assumed that the pumping rate was --  
9 remained steady; right?

10 A. Yes.

11 Q. What was that assumption based  
12 on?

13 A. It was based on the fact that  
14 we didn't have anything to tell us otherwise.  
15 So RWS-1A was pumping at 5.5 GP gallons per  
16 minute in November of 1999, and we assumed  
17 that that was doing that until November 6,  
18 2001.

19 Q. You would agree that you don't  
20 have any data points for 2000 for Well  
21 RWS-1A; right?

22 A. Correct.

23 Q. And because you don't have any  
24 data points, you don't -- you can't know for  
25 certain what the pumping rate was for 2000 --

1 at any point during 2000; right?

2 MS. BAUGHMAN: Objection.

3 Form.

4 THE WITNESS: Yeah, typical  
5 modeling, typical protocol would be if  
6 you don't have any information that  
7 changed, then it's going to continue  
8 until you have a data point that --  
9 that -- that was recorded that said  
10 it -- it hit the pumping ratios.

11 Q. BY MS. SILVERSTEIN: Okay. But  
12 from my understanding, that doesn't mean that  
13 you know that in --

14 A. No, of course not.

15 MS. BAUGHMAN: You've got to  
16 let -- let her finish --

17 THE WITNESS: Oh, sorry.

18 MS. BAUGHMAN: -- her question  
19 before you answer, okay?

20 THE WITNESS: Okay.

21 Q. BY MS. SILVERSTEIN: That  
22 assumption doesn't mean that you know what  
23 the pumping rate was at any point other than  
24 on the dates that you have a data point for;  
25 right?

1 MS. BAUGHMAN: Objection.

2 Form.

3 THE WITNESS: Correct.

4 Q. BY MS. SILVERSTEIN: So the  
5 first well listed here is RWS-1A. And the  
6 first data point in this table is November 1,  
7 1999.

8 Would it be fair to assume that  
9 that means the earliest data point you have  
10 for Well RWS-1A's pumping rate is November 1,  
11 1999?

12 A. Correct.

13 Q. How did you determine which  
14 pumping rate to use between -- from  
15 November 2, 1999, through November 5, 2001?

16 A. For RWS-1A?

17 Q. Yes. For any of the wells.

18 A. It would be the last known  
19 pumping rate.

20 Q. If the pumping rate for Well  
21 RWS-1A was higher than 5.5 gallons per minute  
22 on November 2, 1999, through November 5,  
23 2001, would that affect the concentrations  
24 simulated by the model?

25 MS. BAUGHMAN: Objection.

1                   Form.

2                   THE WITNESS: Concentrations  
3                   where?

4                   Q.         BY MS. SILVERSTEIN: So you  
5                   used the pumping well data to calculate  
6                   concentrations from the well at -- in the  
7                   Tarawa Terrace water system; right?

8                   A.         Yes.

9                   Q.         Okay. So if the pumping rate  
10                  is higher, would -- could that affect the  
11                  concentrations that you calculated?

12                  MS. BAUGHMAN: Objection.

13                  Form.

14                  THE WITNESS: The  
15                  concentrations where?

16                  Q.         BY MS. SILVERSTEIN: So where  
17                  specifically -- when you calculated  
18                  concentrations -- different concentrations,  
19                  where specifically were those for?

20                  A.         The concentrations were  
21                  calculated -- well, the model calculate --  
22                  calculates concentrations at every model  
23                  cell, and then we were specifically looking  
24                  at the observations. The observation points.

25                  Q.         Okay. So those same

1       observation points, assume you're talking  
2       about the same observation point.

3                   Would that -- would a higher  
4       pumping rate potentially change that same  
5       observation -- the concentration in that same  
6       observation point?

7                   MS. BAUGHMAN: Objection; form.

8                   Objection; form.

9                   THE WITNESS: It's possible.

10          Q.        BY MS. SILVERSTEIN: You'd  
11        agree that aside from these five wells  
12        identified in Table 2, all other pumping  
13        wells in the model had zero pumping rates  
14        during the extended simulation you did?

15          A.        That's my understanding, yes.

16          Q.        And that means you assume those  
17        wells were not pumping; right?

18          A.        That's correct.

19          Q.        Why did you make that  
20        assumption?

21          A.        That wasn't an assumption.  
22        That was information that we were given by  
23        the legal team.

24          Q.        What information were you  
25        provided?

1           A.       That the only pumping that was  
2 going on was based on Table 2.

3           Q.        Okay. Did they -- were you  
4 told that or were you provided some kind of  
5 documentation?

6           A.        We were provided the  
7 documentation that we put in Table 2.

8           Q.        And told that this was --  
9 there -- that the other wells not listed here  
10 were not pumping; is that right?

11          A.        We were -- we were told this  
12 was what was pumping during that period of  
13 time.

14          Q.        Okay. I want to go to Table 4.  
15                   Table 4 is titled "Observed PCE  
16 Concentrations At Monitoring Wells, 1995 to  
17 2008"; right?

18          A.        Correct.

19          Q.        Did you prepare this table?

20          A.        No.

21          Q.        Who prepared this table?

22          A.        Dr. Jones.

23          Q.        And are you familiar with the  
24 information in the table?

25          A.        I supplied the information to

1 him.

2 Q. Okay. Where did you get the  
3 information from?

4 A. From the outputs of the model.

5 Q. Okay. So from my  
6 understanding --

7 A. Oh, this is the observed. Oh,  
8 okay, I take it back. I thought this was,  
9 like, computed. So my apologies.

10 So this information was  
11 provided to us by the legal team.

12 Q. And you'd agree that the --  
13 there were localized discrepancies in error  
14 magnitude, particularly in areas where  
15 monitoring wells showed significant temporal  
16 or spatial variability?

17 MS. BAUGHMAN: Objection.

18 Form.

19 THE WITNESS: Can you read that  
20 question again?

21 Q. BY MS. SILVERSTEIN: Sure.

22 You said and would agree that  
23 localized discrepancies and error magnitude,  
24 particularly in areas where monitoring wells  
25 showed significant -- that there were --

1                   MS. BAUGHMAN: If you're  
2 reading from the report, can you tell  
3 us where you're reading from so he can  
4 look at it.

5                   MS. SILVERSTEIN: Sure.

6 Q.               I'm just trying to understand.  
7 Were there localized discrepancies in the  
8 sampling data that you reviewed?

9 A.               What --

10                  MS. BAUGHMAN: Objection.

11                  Form.

12                  THE WITNESS: What do you mean  
13 "discrepancies"?

14                  Discrepancies --

15                  MS. BAUGHMAN: Wait, wait.

16                  THE WITNESS: Sorry.

17 Q.               BY MS. SILVERSTEIN: Okay.  
18 Okay. If you go to Page 4-2, let's start  
19 there.

20 A.               Okay.

21 Q.               You said here that there were  
22 "spatial variations in the observed  
23 concentrations"; right?

24 A.               Correct.

25 Q.               Okay. What do you mean by

1 "spatial variations in the observed  
2 concentrations"?

3 A. Meaning that I could have a  
4 concentration at one point that said one  
5 thing and -- and one right next to it or some  
6 distance away that said something different.

7 Q. And what is your understanding  
8 of why that would be?

9 A. Lots of different reasons.

10 Q. Okay. You said beginning on  
11 the last sentence on Page 4-2 -- well, I'll  
12 start the sentence before. "The observed  
13 concentrations of this well" -- which is  
14 RWS-4A -- "showed extreme fluctuations over  
15 time. The observed concentration of 280  
16 micrograms per liter in January 2002 was  
17 followed only three months later by an  
18 observed concentration of 6,900 micrograms  
19 per liter - the highest value measured. Then  
20 for the sequence of observations from 2003 to  
21 2007, the concentrations oscillated from  
22 1,100 to 0 to 1,000 to 92 to 1,600. This  
23 high degree of fluctuation could be due to  
24 sampling errors, differences in analytical  
25 techniques, and/or extreme heterogeneity in

1 aquifer properties near the well"; right?

2 A. Correct.

3 Q. Okay. So if you can turn back  
4 to Table 4. Well C13 shows a concentration  
5 of 5,400 micrograms per liter in January of  
6 2002; right?

7 A. Uh-huh.

8 Q. Is that a yes?

9 A. Correct.

10 Q. And five months later, May 1,  
11 2002, it shows a value of 140 micrograms per  
12 liter?

13 A. Yes.

14 Q. Is that -- when you referred to  
15 large fluctuations in the text of your  
16 report, is -- is that the kind of fluctuation  
17 you're referring to?

18 A. That's an example.

19 Q. And you'd agree that the May  
20 reading, the May 2002 reading, is less than  
21 5 percent of the January 2002 reading?

22 A. Yes.

23 Q. Is this an anomaly?

24 MS. BAUGHMAN: Objection.

25 Form.

1                   THE WITNESS: Anomaly?

2                 Q.         BY MS. SILVERSTEIN: Do you  
3 consider it -- in your experience, would it  
4 be normal that there would be this kind of  
5 fluctuation?

6                 MS. BAUGHMAN: Objection.

7                 Form.

8                   THE WITNESS: That's normal.

9                 Q.         BY MS. SILVERSTEIN: Okay. And  
10 you described in your report temporal  
11 anomalies. What -- what does a "temporal  
12 anomaly" mean?

13                 MS. BAUGHMAN: Can you show us  
14 where in the report that is so he can  
15 see the context.

16                 MS. SILVERSTEIN: It's in  
17 Section 4 where we were just looking.

18                 Q.         The last paragraph in Section 4  
19 describes "This temporal and spatial  
20 variability in concentrations at selected  
21 wells illustrates the extreme variability  
22 often seen when dealing with concentrations  
23 from data from monitoring wells."

24                 Do you see that?

25                 A.         Yes.

1 Q. Okay. Is this the kind of  
2 temporal variability you're describing?

3 A. That is the temporal  
4 variability, yes.

5 Q. The last sentence there on that  
6 page says "Each of these sites with high  
7 variability is generally correlated with  
8 higher model error, as shown below in the  
9 Results section"; is that right?

10 A. Yes.

11 Q. Could this type of temporal  
12 variability have occurred at the observation  
13 wells that were used in the original Tarawa  
14 Terrace model?

15 MS. BAUGHMAN: Objection.

16 Form.

17 THE WITNESS: Yes, it could.

18 Q. BY MS. SILVERSTEIN: And that  
19 would include Well TT-26?

20 MS. BAUGHMAN: Objection.

21 Form.

22 THE WITNESS: Yes.

23 Q. BY MS. SILVERSTEIN: So I want  
24 to look down at -- back on Table 4 at Well  
25 RWS-2A.

1                   Do you see that?

2                 A.       Yes.

3                 Q.       Okay. It shows that there was  
4                 an observed concentration of 290 micrograms  
5                 per liter on August 1, 2002; is that right?

6                 A.       Yes.

7                 Q.       It also shows that the value on  
8                 the observed concentration on May 1, 2002,  
9                 was 79 micrograms per liter; right?

10                A.       Yes.

11                Q.       And -- well, after August 2002  
12                is for November 1, 2002, and shows  
13                98 micrograms per liter; right?

14                A.       Yes.

15                Q.       The value in May 2002 is less  
16                than 30 percent of the value in August;  
17                right?

18                A.       Yes.

19                Q.       And the value in November 2002  
20                is about a third of what the value was in  
21                August?

22                A.       Yes.

23                Q.       Would that be considered  
24                temporal variability?

25                A.       Yes.

1           Q.       All right. A moment ago we  
2         looked at the part of your report that says  
3         that this kind of variability likely resulted  
4         from natural subsurface variability sampling  
5         errors, differences in analytical methods.

6                   Do you remember that?

7           A.       Yes.

8           Q.       By sampling area -- error --  
9         excuse me -- do you mean that the sample  
10        results wouldn't reflect the actual  
11        concentration in the water?

12          A.       That's one -- that's one  
13        possibility.

14          Q.       Okay. What else does "sampling  
15        error" mean?

16          A.       Just how -- how the sample was  
17        collected, how it was stored, how -- from the  
18        moment that it was removed from the aquifer  
19        to the moment it got to the lab.

20          Q.       Okay. And the errors from the  
21        moment it got to the aquifer to the moment it  
22        got to the lab might mean that the sample  
23        results don't reflect the concentration in  
24        the water -- in the aquifer; right?

25          A.       That's possible.

1 Q. Okay. I want to look at  
2 Figure 6.

3 MS. BAUGHMAN: Did you say  
4 "Figure" or "Table 6"?

5 MS. SILVERSTEIN: I said  
6 "Figure 6."

7 MS. BAUGHMAN: Figure 6, okay.

8 Q. BY MS. SILVERSTEIN: And the  
9 sampling errors that we discussed a moment  
10 ago between the moment the sample is taken  
11 and when it gets to the lab, is it possible  
12 that those same -- that same type of sampling  
13 error occurred with samples taken in the  
14 1980s?

15 MS. BAUGHMAN: Objection.

16 Form.

17 THE WITNESS: It's possible.

18 Q. BY MS. SILVERSTEIN: And that  
19 includes models taken at -- that includes  
20 samples taken at Tarawa Terrace in the 1980s;  
21 right?

22 MS. BAUGHMAN: Objection.

23 Form.

24 THE WITNESS: Yes, it's  
25 possible.

1 Q. BY MS. SILVERSTEIN: Okay. So  
2 Figure 6 is titled "Simulated versus observed  
3 PCE concentrations from (a) Original Model  
4 and (b) Extended Model Tarawa Terrace Flow  
5 and Transport Model Post-Audit"; is that  
6 right?

7 A. Correct.

8 Q. Did you make this figure?

9 A. No. I believe this was  
10 Dr. Jones.

11 Q. It's fair to assume that you're  
12 familiar with it?

13 A. Very much so. I gave him -- I  
14 supplied him the data.

15 Q. Great.

16 Do you agree with how the data  
17 in Figure 6 is visually portrayed?

18 MS. BAUGHMAN: Objection.

19 Form.

20 THE WITNESS: Yes, I agree how  
21 it's visually prepared.

22 Q. BY MS. SILVERSTEIN: Are there  
23 any changes that you would make to Figure 6?

24 MS. BAUGHMAN: Objection.

25 Form.

1                   THE WITNESS: No.

2                   MS. BAUGHMAN: You mean as -- I  
3 mean, it was updated in the --

4                   THE WITNESS: Yeah.

5                   MS. BAUGHMAN: -- in the  
6 rebuttal report --

7                   THE WITNESS: Yeah.

8                   MS. BAUGHMAN: -- is that what  
9 you're asking?

10                  Q.        BY MS. SILVERSTEIN: Are there  
11 any changes that you would make to how it is  
12 portrayed?

13                  A.        No.

14                  Q.        Go ahead and look at  
15 Section 5-2.

16                  You would agree that the  
17 simulated values from your post-audit are  
18 biased on the high side; right?

19                  MS. BAUGHMAN: Objection.  
20 Form.

21                  THE WITNESS: We did state in  
22 our report that it appeared that the  
23 computed values were biased high.

24                  Q.        BY MS. SILVERSTEIN: That means  
25 that the computed values are higher than the

1 observed values; right?

2 A. Correct. But I would -- I  
3 would add that where it was most important at  
4 TT-26, the simulated values matched very  
5 closely to the observed values.

6 Q. So in this report you state --  
7 you said that when the sites with zero  
8 observed or simulated concentrations are  
9 factored in, the errors are balanced; right?

10 A. Where are you -- where are you  
11 reading?

12 Q. Well, would you agree that when  
13 you factor in the zero observed  
14 concentrations, the -- the results are  
15 balanced?

16 MS. BAUGHMAN: If you're  
17 reading from his report, you need to  
18 show -- he asked you where you're  
19 reading from.

20 Q. BY MS. SILVERSTEIN: Okay. It  
21 is in Section 5.1, the second paragraph. The  
22 last sentence.

23 Do you -- do you agree that  
24 when you factor in the -- the zero observed  
25 or simulated concentrations, the errors are

1 balanced?

2 A. Well, we wrote "well balanced."

3 Q. You wrote "However, when the  
4 sites with zero observed or simulated  
5 concentrations not shown on Figure 6 are  
6 factored in, the errors are balanced, as  
7 indicated by the low mean error reported  
8 above"; is that right?

9 MS. BAUGHMAN: It's the last  
10 sentence of the second paragraph.

11 THE WITNESS: Okay, hold on.

12 Correct, yes.

13 Q. BY MS. SILVERSTEIN: Okay. I  
14 want you to go to Page Roman Numeral vi, the  
15 Executive Summary.

16 And if you look at the fourth  
17 paragraph, the -- the third sentence you  
18 wrote "There were localized discrepancies in  
19 error magnitude, particularly in areas where  
20 monitoring wells showed significant temporal  
21 and spatial variability"; is that right?

22 A. Correct.

23 Q. Okay. So I want to go back to  
24 Table 4.

25 My understanding, I believe

1 what you said earlier, is that this table  
2 shows actual sample results at the monitoring  
3 wells; is that right?

4 A. Correct.

5 Q. Okay. So, for example, Well C1  
6 shows -- lists sample results for ten  
7 different dates; is that right?

8 A. Correct.

9 Q. Okay. And then the dash for  
10 June 1, 1997, and January 1, 2002, does that  
11 mean that a sample wasn't taken from Well C1  
12 on those dates?

13 A. I don't know. I assume, but I  
14 don't know if that's the reason.

15 Q. Okay. When provided the --  
16 this data for your use in the post-audit,  
17 what did you understand the dashes -- like,  
18 at June 1, 1997, and January 1, 2002, what  
19 did you understand that to mean?

20 A. That no sample was recorded.

21 Q. And for Well C1, the "less than  
22 DL," does that mean that the samples  
23 collected yielded results below the detection  
24 limit?

25 A. That's my understanding, yeah.

1           Q.       Do you know what the detection  
2       limit was?

3           A.       In 19- -- or in 2000, not off  
4       the top of my head.

5           Q.       Okay. Would it be fair to say  
6       that Well C1 doesn't exhibit any, like,  
7       temporal anomalies, temporal variant --  
8       variability?

9           A.       No, because just because it was  
10      below the detection limit doesn't mean that  
11      it didn't vary.

12          Q.       Okay. When you say "temporal  
13      variability," does that mean any kind of  
14      change in the concentration?

15          A.       Yes.

16          Q.       Okay. So even if it was going  
17      from, for example, 58 micrograms per liter to  
18      57 micrograms per liter, you would -- you  
19      describe that as temporal variability?

20          A.       Sure.

21          Q.       Is -- when you talked about  
22      temporal variability in your report, is that  
23      what you were describing?

24                   MS. BAUGHMAN: Objection.

25                   Form.

1                   THE WITNESS: No. We were --  
2                   we were talking more about wider  
3                   ranges than from 57 to 58.

4                   Q.         BY MS. SILVERSTEIN: Okay. And  
5                   when you say "wider ranges," what do you  
6                   mean?

7                   MS. BAUGHMAN: Objection.

8                   Form.

9                   THE WITNESS: It's subjective.

10                  Q.         BY MS. SILVERSTEIN: Okay.  
11                  When you say "wider ranges" and -- in the  
12                  report that you wrote, what did you  
13                  subjectively mean?

14                  MS. BAUGHMAN: Objection.

15                  Form.

16                  THE WITNESS: One example would  
17                  be C13.

18                  Q.         BY MS. SILVERSTEIN: Okay. And  
19                  that's because the difference between 5,400  
20                  to -- micrograms per liter to 140 micrograms  
21                  per liter is -- is large?

22                  A.         Is -- it's -- it's a  
23                  difference, yes.

24                  Q.         Okay. When you were discussing  
25                  temporal variability in your report, were you

1 referring to -- well, scratch that.

2 Is your understanding that  
3 there could have been the kind of temporal  
4 variability we're discussing in your report  
5 in monitoring Well C1 based on the nondetect  
6 sample results?

7 MS. BAUGHMAN: Objection.

8 Form.

9 THE WITNESS: It could, but the  
10 lab reported it as nondetect -- or  
11 below the detection level.

12 MS. SILVERSTEIN: Okay.

13 THE WITNESS: So we had nothing  
14 to go by.

15 Q. BY MS. SILVERSTEIN: Okay. And  
16 so would zero to the detection level, is that  
17 a big enough difference that it would have  
18 been temporal variability?

19 MS. BAUGHMAN: Objection.

20 Form.

21 MS. SILVERSTEIN: As described  
22 in your report.

23 MS. BAUGHMAN: Objection.

24 Form.

25 THE WITNESS: Yes, it's

1           possible.

2           Q.        BY MS. SILVERSTEIN:  Do you  
3       have an understanding of about where the  
4       detection limit was for these samples?

5           A.        In '97 and 2000, no, not off  
6       the top of my head.  I'd have to look it up.

7           Q.        Do you know what the detection  
8       limit for PCE is today?

9           A.        I should know it off the top of  
10      my head, but I would have to look it up.

11          Q.        If the detection limit was 10  
12      micrograms per liter, would you consider it  
13      to be temporal variability as described in  
14      your report if there was a defect -- if there  
15      was a sample result of 1 microgram per liter  
16      and a sample result of 10 micrograms per  
17      liter?

18                   MS. BAUGHMAN:  Objection.

19                   Form.

20                   THE WITNESS:  Yes, that's  
21      varying.

22          Q.        BY MS. SILVERSTEIN:  Okay.  Is  
23      that -- when you said "temporal variability"  
24      in your report, were -- did you mean  
25      something like 10 micrograms per liter?

1 MS. BAUGHMAN: Objection.

2 Form.

3 Why don't you show him where in  
4 your report you're using that phrase  
5 so he can tell you what it means.

6 MS. SILVERSTEIN: He's used  
7 "temporal variability" multiple times  
8 and has read it. I'm asking his  
9 understanding of how he described  
10 that --

11 MS. BAUGHMAN: Well, since  
12 he's --

13 MS. SILVERSTEIN: -- in his  
14 work.

15 MS. BAUGHMAN: -- in different  
16 contexts at different times, you  
17 should show him what sentence you're  
18 asking for clarification.

19 Q. BY MS. SILVERSTEIN: When you  
20 said "temporal variability" -- I'm not asking  
21 about clarification for a specific sentence.

22 When you said "temporal  
23 variability" in your report, did you mean  
24 multiple different things?

25 MS. BAUGHMAN: Objection.

1                   Form.

2                   THE WITNESS: No.

3                   Q.

4                   MS. SILVERSTEIN: Okay.

5                   THE WITNESS: But there's  
6                   obviously a degree of variability.

7                   Q.         BY MS. SILVERSTEIN: Okay. And  
8                   in your opinion, in your work, what does that  
9                   mean?

10                  MS. BAUGHMAN: Objection.

11                  Form.

12                  THE WITNESS: Temporal  
13                  avail- -- temporal variability? What  
14                  that means? That means that at a  
15                  specific location, it's not constant.

16                  Q.         BY MS. SILVERSTEIN: Okay. So  
17                  any kind of change --

18                  A.         Over -- over time.

19                  Q.         Any kind of change over time?

20                  A.         Yeah. Those could be small,  
21                  those could be -- they -- they could be  
22                  large.

23                  Q.         Okay. A few minutes ago you  
24                  said the temporal variability could be due to  
25                  differences in analytical techniques.

1                   Do you remember that?

2           A.       Yes.

3           Q.       What do you mean "differences  
4       in analytical techniques"?

5           A.       Depending on how the lab  
6       analyzed the sample.

7           Q.       Okay. Could there be multiple  
8       correct -- scientifically correct ways to  
9       analyze a sample?

10          A.       That's possible.

11          Q.       Would multiple scientifically  
12       correct ways to analyze a sample -- the same  
13       sample result in different sample results?

14          A.       That is possible.

15          Q.       Okay. What different  
16       analytical techniques to analyze a sample  
17       result are you aware of?

18          A.       I would say that's generally  
19       out of my area of expertise.

20          Q.       Okay. Do you consider what  
21       analytical technique was used to interpret a  
22       sample when you are working on your models?

23                   MS. BAUGHMAN: Objection.

24                   Form.

25                   THE WITNESS: That's -- that's

1            generally out of my area of expertise,  
2            and so when I'm getting lab report --  
3            when I'm getting lab data back, I make  
4            sure that those professionals that  
5            understand the analysis and that check  
6            the analysis and make sure that the  
7            correct lab testing was done and that  
8            those -- those numbers get  
9            quality-checked when they come to me.

10          Q.        BY MS. SILVERSTEIN: Okay. Did  
11         you review the, like, lab reports of the  
12         samples for the observed PCE concentrations  
13         at the monitoring wells listed here?

14          A.        No.

15          Q.        You also identified extreme  
16         hetero -- heterogeneity --

17          A.        Heterogeneity.

18          Q.        Heterogeneity, thank you.

19          A.        It's okay.

20          Q.        -- and aquifer properties as  
21         something that could lead to temporal  
22         variability; is that right?

23          A.        Correct.

24          Q.        What does extreme  
25         heterogeneity, what does that mean?

1           A.       Yeah. It probably -- the best  
2 way to describe it is to look at our rebuttal  
3 report and the Figure 2. But heterogeneity  
4 means basically it's not the same.

5                     The -- the porous media and the  
6 water that flows through the porous media is  
7 not the same and uniform. And so as  
8 contaminants are getting carried by the water  
9 through the porous media, that -- that can  
10 vary widely.

11                  And so that's generally a  
12 spatial difference. So you could have a  
13 monitoring well, two monitoring wells fairly  
14 close together and get widely different  
15 answers.

16           Q.       Okay. Is that something that  
17 you look at when -- whether -- whether  
18 there's extreme heterogeneity --  
19 heterogeneity or not? Is that something that  
20 you consider when working on a -- a  
21 groundwater model?

22           A.       Correct.

23                  MS. BAUGHMAN: Objection.

24                  Form.

25                  THE WITNESS: Correct.

1 Q. BY MS. SILVERSTEIN: Okay.

2 Okay. I want to talk about the pumping  
3 schedules that you -- you considered.

4 As we discussed earlier, you  
5 considered pumping history when working on  
6 the post-audit; right?

7 A. Considered? What do you mean?

8 Q. Pumping history was one of  
9 the -- the parameters used in your  
10 post-audit; right?

11 A. Correct.

12 Q. And is it your understanding  
13 that ATSDR assumed that after entering  
14 service, wells operated continuously unless  
15 they were documented as offline?

16 MS. BAUGHMAN: Objection.

17 Form. Asked and answered.

18 THE WITNESS: It -- in -- in  
19 the original model?

20 MS. SILVERSTEIN: Yes.

21 THE WITNESS: Yes.

22 Q. BY MS. SILVERSTEIN: Would you  
23 expect the wells at Tarawa Terrace to need  
24 maintenance?

25 A. Yes.

1           Q.        Okay. It would be fair to say  
2        that the wells wouldn't be operating during a  
3        maintenance period; right?

4           A.        Correct.

5           Q.        Would you expect that every  
6        period of maintenance was documented in --  
7        was documented?

8                   MS. BAUGHMAN: Objection.

9                   Form.

10                  THE WITNESS: Would I assume  
11        that it was documented? No, I would  
12        not assume that.

13                  Q.        BY MS. SILVERSTEIN: Okay.  
14        Were you aware that there was an expert panel  
15        on the Camp Lejeune water modeling in  
16        March 2005?

17                  A.        Yes, I was aware.

18                  Q.        Did you review the transcript  
19        of that expert panel in preparing your  
20        reports?

21                  A.        No.

22                  Q.        Do you know why ATSDR modeled  
23        wells as always pumping unless known to be  
24        off?

25                   MS. BAUGHMAN: Objection.

1                   Form.

2                   THE WITNESS: From my  
3                   experience, that's pretty standard.

4                   Q.         BY MS. SILVERSTEIN: Okay. And  
5                   you reviewed the expert panel in preparing  
6                   your rebuttal report; is that right?

7                   A.         The 2005? I don't recall.

8                   Q.         Okay.

9                   A.         We may have some quotes from  
10                  there, but I don't remember reading it cover  
11                  to cover.

12                  Q.         Okay. How did you determine  
13                  which quotes to use?

14                  MS. BAUGHMAN: Objection.

15                  Form.

16                  THE WITNESS: I don't recall.

17                  Q.         BY MS. SILVERSTEIN: You  
18                  reviewed the 2009 expert panel in preparing  
19                  your rebuttal report?

20                  A.         I'm all --

21                  MS. BAUGHMAN: You can look at  
22                  the report, if you want to, to answer.

23                  THE WITNESS: I don't have  
24                  that.

25                  MS. BAUGHMAN: The rebuttal?

1           She didn't mark that?

2           THE WITNESS: No, the --

3           MS. SILVERSTEIN: It's marked  
4           as Exhibit 3. If you could turn to --

5           THE WITNESS: Oh, the rebuttal.

6           MS. SILVERSTEIN: -- Page 3-7  
7           of your rebuttal report. Okay.

8           THE WITNESS: 3-7? Okay.

9           Q.       BY MS. SILVERSTEIN: Okay. And  
10          so did you review the 2009 expert panel?

11          A.       Not cover to cover.

12          Q.       How did you determine what  
13          parts to review?

14          MS. BAUGHMAN: Objection.

15          Form. Asked and answered.

16          THE WITNESS: To my  
17          recollection, we -- we were looking  
18          for just specific -- we were looking  
19          at specific arguments or statements  
20          that were set, but I did not read that  
21          report cover to cover.

22          Q.       BY MS. SILVERSTEIN: You said  
23          that it's standard to assume that the well --  
24          the well was pumping unless documented as out  
25          of service; right?

1           A.       Generally, yes.

2           Q.       Why is that considered  
3 standard?

4           A.       Because you don't have any  
5 information otherwise.

6           Q.       Would it be a conservative  
7 assumption to assume that the wells are  
8 pumping unless documented otherwise?

9                   MS. BAUGHMAN: Objection.

10                  Form.

11                  THE WITNESS: I would not use  
12 the word "conservative."

13                  Q.       BY MS. SILVERSTEIN: Why not?

14                  A.       That's not a word I would  
15 describe pumping and continuous pumping.

16                  Q.       Okay. How would you describe  
17 that assumption, the assumption that the  
18 wells are pumping unless documented as off?

19                  MS. BAUGHMAN: Objection.

20                  Form. Asked and answered.

21                  THE WITNESS: Standard.

22                  Standard approach, standard protocol.

23                  Q.       BY MS. SILVERSTEIN: Okay. Is  
24 it typical to have more wells pumping than  
25 are needed to meet user demand?

1 MS. BAUGHMAN: Objection.

2 Form.

3 THE WITNESS: I -- the pumping  
4 schedules are going to be -- are going  
5 to be totally dependent on the  
6 municipality and the person or --  
7 usually it's some person that's --  
8 that's overseeing the water supply.

9 Q. BY MS. SILVERSTEIN: Okay.

10 Would it -- would you agree that having more  
11 wells pumping than is necessary to meet  
12 demand would create redundancy?

13 A. Redundancy in what way?

14 Q. It would mean that there's  
15 more -- more wells are being used and  
16 operated than are necessary?

17 MS. BAUGHMAN: Objection.

18 Form.

19 THE WITNESS: Again, that's  
20 going to vary municipality to  
21 municipality. It would be up to  
22 the -- the operator to determine how  
23 much water was needed and how much  
24 water was going to be stored.

25 Q. BY MS. SILVERSTEIN: Did you --

1 what did you review that provided information  
2 about the Camp Lejeune policy on pumping more  
3 water than is necessary?

4 MS. BAUGHMAN: Objection.

5 Form.

6 THE WITNESS: Did not read  
7 anything in that regard.

8 Q. BY MS. SILVERSTEIN: Okay.

9 Would it be fair to say that the data  
10 indicating the pumpage rate at individual  
11 Tarawa Terrace water supply wells was not  
12 available for ATSDR's initial model?

13 MS. BAUGHMAN: Objection. Form  
14 and foundation.

15 THE WITNESS: Okay. Can you  
16 ask -- ask that question again?

17 Q. BY MS. SILVERSTEIN: Sure.

18 You would agree that the  
19 data -- the data points for the pumping rate  
20 for the individual Tarawa Terrace water  
21 supply wells wasn't available to ATSDR when  
22 they did their model; right?

23 MS. BAUGHMAN: Objection. Form  
24 and foundation.

25 THE WITNESS: That's my

1                   understanding.

2                 Q.         BY MS. SILVERSTEIN: Okay. And  
3         if you could go to Chapter C, which is  
4         Exhibit 7, and turn to Page C70.

5                   Page C70 has Table C3.1, which  
6         is titled "Capacity and operational history  
7         of water-supply Well TT-26 Tarawa Terrace  
8         Marine Corps Base Camp Lejeune,  
9         North Carolina"; is that right?

10               A.         Correct.

11               Q.         And you'd agree that there are  
12         18 entries here?

13               A.         Correct.

14               Q.         So then you would agree that  
15         the data for the well capacity and  
16         operational history is limited to 18 entries  
17         over the 40-year model time period?

18               MS. BAUGHMAN: Objection. Form  
19         and foundation.

20               THE WITNESS: Based on this --  
21         what's being reported in this table,  
22         yes.

23               Q.         BY MS. SILVERSTEIN: And you're  
24         not aware of any data points that are not  
25         included in this table?

1 MS. BAUGHMAN: Same objections.

2 THE WITNESS: Correct.

3 Q. BY MS. SILVERSTEIN: I notice  
4 that you highlighted something in the  
5 exhibit. What did you highlight?

6 A. Just highlighted the table and  
7 that it was reporting TT-26.

8 Q. Another piece of data that you  
9 used in your post-audit was the mass loading  
10 data; is that right?

11 A. Correct.

12 Q. In the -- in ATSDR's MT3DMS  
13 simulation, this -- the -- the spill at ABC  
14 Cleaners was simulated using a mass loading  
15 rate of 1,200 gallons per day; right?

16 A. 1,200 what?

17 Q. Gallons per day.

18 A. No.

19 Q. What was it?

20 A. Let's turn to the --

21 Q. Well, so do you know what the  
22 mass loading rate that ATSDR simulated was?

23 A. It was 1200, but it's not  
24 gallons per day.

25 Q. Okay.

1           A.       So we can -- we can -- turn to  
2       that page.

3           Q.       Grams per day, I'm sorry.  
4                   Is it grams -- that's grams per  
5       day?

6           A.       Yes.

7           Q.       Okay. And that was in a single  
8       cell from January 1953 to December 1983;  
9       right?

10          A.       Correct.

11          Q.       For the extended simulation or  
12       post-audit that you did, you didn't change  
13       the mass loading rate, did you?

14          A.       No.

15          Q.       What did you do to verify that  
16       the mass loading rate was correct?

17          A.       Nothing.

18          Q.       Do you know what -- and you  
19       also used a start date of January 1953.

20                   Did you assume that date was  
21       correct?

22          A.       Yes.

23          Q.       Do you know what the  
24       January 1953 date is based on?

25          A.       I'm assuming that it was when

1           the ABC Cleaners began operations.

2           Q.       And do you know what the  
3       12,000 -- or 1,200 -- excuse me -- grams per  
4       day was based on?

5           A.       It was a number that came  
6       through the calibration of the model.

7           Q.       Did you review the expert  
8       report by Dr. Spiliotopoulos?

9           A.       I did.

10          Q.       Did you review the report by  
11       Dr. Jay Brigham?

12          A.       I briefly went through it. It  
13       didn't really have anything to do with our  
14       work.

15          Q.       When you were reviewing either  
16       Dr. Spiliotopoulos' report or Dr. Brigham's  
17       report, did you see their discussion of the  
18       ABC Cleaner's opening date?

19          A.       Yes.

20          Q.       Would it be fair to say that  
21       changing the date that mass -- the mass  
22       loading began from January 1953 to 1954 could  
23       change the model results?

24                   MS. BAUGHMAN: Objection.

25                   Form.

1                   THE WITNESS: It could. And in  
2 our evaluation, it made very little  
3 difference.

4                   Q.         BY MS. SILVERSTEIN: Did you  
5 change the mass loading date in any of your  
6 simulations?

7                   A.         During the rebuttal report  
8 phase, yes.

9                   Q.         Would it be fair to say that if  
10 the start date of the ABC Cleaner spill was  
11 later than January 1953, that could mean that  
12 the PCE reached the supply wells at a later  
13 date?

14                   MS. BAUGHMAN: Objection.

15                   Form.

16                   THE WITNESS: As I stated, it  
17 made very little difference.

18                   Q.         BY MS. SILVERSTEIN: Does that  
19 mean that it could change the date that the  
20 PCE reached the supply wells?

21                   MS. BAUGHMAN: Objection.

22                   Form.

23                   THE WITNESS: Yes, it could.

24                   Q.         BY MS. SILVERSTEIN: Do you  
25 have any reason to believe that

1 Dr. Spiliotopoulos or Dr. Brigham is  
2 incorrect in their discussion of the opening  
3 date of ABC Cleaners?

4 MS. BAUGHMAN: Objection. Form  
5 and foundation.

6 THE WITNESS: Do I --

7 MS. BAUGHMAN: Outside the  
8 scope.

9 THE WITNESS: Yeah, I don't  
10 have an opinion of what they think or  
11 know.

12 Q. BY MS. SILVERSTEIN: Okay. You  
13 don't have an opinion as to whether the date  
14 that ABC Cleaners opened was in 1953 or 1954?

15 MS. BAUGHMAN: Same objections.

16 THE WITNESS: Yeah, I have -- I  
17 have no -- I'm -- I'm doing my work  
18 based on what was reported in the  
19 original document.

20 Q. BY MS. SILVERSTEIN: Okay. And  
21 you didn't do anything to verify the mass  
22 loading start date that was used in the ATSDR  
23 document?

24 A. Correct.

25 Q. What did you do to verify the

1       rate of 1,200 grams per day through  
2 December 1983?

3                     MS. BAUGHMAN: Objection. Form  
4                     and foundation. Asked and answered.

5                     THE WITNESS: No. We -- we  
6                     didn't -- we just took the numbers  
7                     that were given to us in the report.

8                     Q.             BY MS. SILVERSTEIN: Okay. You  
9                     assumed that ATSDR was correct in that?

10                  A.             Correct.

11                  Q.             Okay. If the rate is  
12                  different -- was different than 1,200 grams  
13                  per day for some or all of the dates from  
14                  1953 to 1987, would -- could that change the  
15                  concentration -- the simulated concentration  
16                  results?

17                  A.             Yes, that's possible.

18                  MS. SILVERSTEIN: Okay. I  
19                  think we've been going for over an  
20                  hour, so this would be a good time for  
21                  a break.

22                  THE VIDEOGRAPHER: We're off  
23                  the record. The time is 2:06.

24                  (There was a break taken.)

25                  THE VIDEOGRAPHER: We're back

on the record. The time is 2:27.

2 This is Media Number 4.

3 Counsel may proceed.

4 Q. BY MS. SILVERSTEIN: Mr. Davis,  
5 did you talk to the attorneys about the  
6 substance of your testimony while you were on  
7 break?

8 A. NO.

9 Q. Right before the break we were  
10 talking about the mass loading -- the mass  
11 loading date -- data that you used.

14 A. Yes.

15 Q. And you accepted ATSDR's  
16 determination that 1200 grams per day was the  
17 mass loading rate?

18 A. Correct.

19 Q. Is it reasonable to assume that  
20 the first day that ABC Cleaners spilled PCE  
21 into the water, the mass loading rate was  
22 1200 grams per day?

23 A. That's the assumption.

24 Q. And is that, in your opinion, a  
25 reasonable assumption?

1           A.       Yes.

2           Q.       Would that assumption take into  
3       account the time it takes for the PCE to get  
4       to the aquifer?

5           MS. BAUGHMAN: Objection.

6           Form.

7           THE WITNESS: By putting 1200  
8       in, the model is going to interpret  
9       that as -- as an immediate -- an  
10      immediate source starting on that day.

11          Q.       BY MS. SILVERSTEIN: Okay. And  
12       it would be fair to say that the PCE has to  
13       move from ABC Cleaners to the aquifer; right?

14          MS. BAUGHMAN: Objection.

15          Form.

16          THE WITNESS: Yes, that's the  
17       physical process.

18          Q.       BY MS. SILVERSTEIN: Because  
19       ABC Cleaners weren't dumping PCE into the  
20       aquifer itself; right?

21          A.       That's my understanding.

22          Q.       And on the day that the PCE was  
23       first spilled by ABC Cleaner, do you think  
24       that it's reasonable to assume 1200 grams of  
25       PCE would, on the same day, get to the

1 aquifer?

2 MS. BAUGHMAN: Objection.

3 Form.

4 THE WITNESS: We -- we don't  
5 know.

6 Q. BY MS. SILVERSTEIN: Does -- as  
7 the PCE moved to the aquifer, some of it  
8 would volatilize; right?

9 A. It's possible.

10 Q. Does the mass loading rate take  
11 into account the volatilization?

12 A. Yes.

13 Q. How so?

14 A. Because that mass rate was  
15 calculated through a -- an effort of  
16 calibration to say this is what we -- through  
17 calibration, this is the mass loading number  
18 that we're going to use to match what we're  
19 measuring in the -- in the field at the  
20 observation points.

21 Q. How -- what was the  
22 volatilization rate that ATSDR used in their  
23 calibration?

24 MS. BAUGHMAN: Objection.

25 Form.

1                   THE WITNESS: There's no such  
2 volatilization rate.

3                   Q.         BY MS. SILVERSTEIN: Okay. How  
4 did they determine how much of the PCE would  
5 volatilize?

6                   MS. BAUGHMAN: Objection. Form  
7 and foundation.

8                   THE WITNESS: They didn't, is  
9 my understanding. My understanding is  
10 they came up with the 1200 number  
11 through a calibration effort.

12                  Q.         BY MS. SILVERSTEIN: Okay. The  
13 amount of PCE that volatilized depends on --  
14 would depend on soil conditions?

15                  A.         That's part of it.

16                  Q.         Right. And it could depend on  
17 the temperature?

18                  A.         That's part of it.

19                  Q.         And on the precipitation rate?

20                  A.         Yes.

21                  Q.         Okay. And the temperature at  
22 Camp Lejeune would change over the -- from  
23 1953 to 1987; right?

24                  A.         I would assume so.

25                  Q.         And the precipitation wasn't

1       the same every day during that time period?

2           A.       That's my understanding.

3           Q.       Okay. And ATSDR didn't change  
4       the mass loading based on the temperature;  
5       right?

6           A.       No. The number that they used  
7       was a constant number through that time  
8       period which was derived through their  
9       calibration efforts.

10          Q.       Okay. And to your knowledge --  
11       well, and that constant number didn't vary at  
12       all depending on the precipitation or outside  
13       temperature, did it?

14          A.       No. It was in the model. It  
15       was a constant 1200 through that time frame.

16          Q.       Okay. And in your opinion,  
17       would the constant of 1200 -- does that --  
18       would that be what the real-world conditions  
19       show, that it's the same every single day?

20          A.       With --

21                   MS. BAUGHMAN: Objection.

22                   Form.

23                   THE WITNESS: Without  
24       additional information, that would be  
25       a standard practice.

1 Q. BY MS. SILVERSTEIN: Okay. And  
2 by "standard practice," do you mean that  
3 that's a standard assumption?

4 A. No. Standard practice in a  
5 modeling effort, unless you have it and  
6 information to -- to suggest otherwise,  
7 you're going to assume that that was the mass  
8 loading rate.

9 Q. Did ATSDR choose the mass  
10 loading rate that it needed to fit the data  
11 from the 1980s?

12 A. That was part of the  
13 calibration effort, correct.

14 Q. Would it be accurate to say  
15 that you are not offering any opinions on how  
16 the contaminants moved from Model Layer 1 to  
17 other layers?

18 MS. BAUGHMAN: Objection.

19 Form.

20 THE WITNESS: I -- we did not  
21 offer that opinion, no.

22 Q. BY MS. SILVERSTEIN: Okay. If  
23 you could go to Chapter F, which is  
24 Exhibit 8, and turn to Page F12.

25 And I want to look at the

1 paragraph on the right-hand side of the page.  
2 It says "ABC One-Hour Cleaners always used  
3 PCE in its dry cleaning operations, beginning  
4 during 1953 when the business opened. A  
5 primary pathway of contaminants from the  
6 dry-cleaning operation at ABC One-Hour  
7 Cleaners to the soil and subsequently to the  
8 groundwater was apparently through a septic  
9 tank soil absorption system to which  
10 ABC One-Hour Cleaners discharged waste and  
11 wastewater."

12 Did I read that correctly?

13 A. Yes.

14 MS. BAUGHMAN: You left off the  
15 source of the 1953, the deposition of  
16 Mr. Melts, the owner. You didn't read  
17 that.

18 THE WITNESS: Yeah, she started  
19 with "A primary pathway."

20 MS. BAUGHMAN: No, she started  
21 with the first sentence.

22 THE WITNESS: Oh, okay, yeah,  
23 my fault.

24 Q. BY MS. SILVERSTEIN: Did I read  
25 that correctly? Are you following where I'm

1 reading that?

2 A. Yeah. Could you read it again.

3 Q. Sure. "ABC One-Hour Cleaners  
4 always used PCE in its dry-cleaning operation  
5 beginning during 1953 when the business  
6 opened." Then cites a deposition. "A  
7 primary pathway of contaminants from the  
8 dry-cleaning operations at ABC One-Hour  
9 Cleaners to the soil and subsequently to  
10 groundwater was apparently through a septic  
11 tank soil absorption system to which  
12 ABC One-Hour Cleaners discharged waste and  
13 wastewater."

14 Did I read that correctly?

15 A. Yes.

16 Q. And if you skip down a couple  
17 lines, it says "In addition, spent PCE was  
18 routinely reclaimed using a  
19 filtration-distillation process that" was  
20 produced -- "that produced dry 'still  
21 bottoms' which until about 1982" -- again a  
22 citation -- "or 1984/1985 were disposed of  
23 onsite generally by filling potholes in a  
24 nearby alleyway"; is that correct?

25 A. Yes.

1 Q. Okay. And I see you're  
2 highlighting something.

3 What are you highlighting?  
4 A. Just the parts that you're  
5 reading.

6 Q. Okay. Did you highlight  
7 anything other than what I read out loud?

8 A. No.

9 Q. So then you would agree that  
10 ATSDR called the septic tank soil absorption  
11 system a primary pathway of contaminants from  
12 the dry cleaning operations?

13 A. That's what they wrote,  
14 correct.

15 Q. And you'd agree that ATSDR  
16 assumed that the spillways was disposed of  
17 outside until either 1982 or 1984/1985;  
18 right?

19 MS. BAUGHMAN: Objection.  
20 Form.

21 THE WITNESS: That's what they  
22 wrote.

23 Q. BY MS. SILVERSTEIN: If the end  
24 date of ABC Cleaners' PCE outside solid waste  
25 disposal or drain pipe is earlier than the

1       day ATSDR assumed, could that change the  
2       simulated concentrations?

3                     MS. BAUGHMAN: Objection. Form  
4       and foundation.

5                     THE WITNESS: Yes, that is  
6       possible.

7       Q.            BY MS. SILVERSTEIN: Would you  
8       agree that changes in ABC Cleaner's disposal  
9       system would change the mass loading rate?

10                  MS. BAUGHMAN: Objection.

11                  Form. Foundation.

12                  THE WITNESS: Yes. That could  
13       have an impact on the -- on the mass  
14       loading rate.

15       Q.            BY MS. SILVERSTEIN: In your  
16       extended simulation or post-audit, you didn't  
17       account for possible changes to the mass  
18       loading data; right?

19                  MS. BAUGHMAN: Objection.  
20                  Form.

21                  THE WITNESS: It had already  
22       stopped. In our extension, there was  
23       no mass loading.

24       Q.            BY MS. SILVERSTEIN: Right.  
25       And you didn't account for any changes in

1       that most -- mass loading rate when you were  
2       doing the post-audit; right?

3                   MS. BAUGHMAN: Objection.

4                   Form.

5                   THE WITNESS: Correct.

6       Q.       BY MS. SILVERSTEIN: You can go  
7       ahead and set Exhibit 8 aside.

8                   And I want to go back to your  
9       report to Page 5-1.

10      A.       The original one?

11      Q.       Yes.

12                  You would agree that when  
13       simulating the migration of PCE, it can be  
14       challenging to achieve a close match between  
15       the simulated results and the observed  
16       results; is that right?

17      A.       Sorry, I was looking at the  
18       wrong one.

19      Q.       That's okay. I'm not pointing  
20       you to a specific point right now.

21      A.       Okay. Can you ask the question  
22       again?

23      Q.       Sure.

24                  You'd agree that when  
25       simulating the migration of a PCE contaminant

1 plume, it can be difficult or challenging to  
2 achieve a close match between the simulated  
3 and observed concentrations; right?

4 A. Correct.

5 Q. Why would it be difficult to --  
6 or challenging to achieve a close match  
7 between the simulated and observed  
8 concentrations?

9 A. I think we addressed this in  
10 the report, but it's -- with a transport,  
11 it's difficult because the observations vary.  
12 Sometimes they're close together, sometimes  
13 they vary in time, and so trying to match  
14 that at a specific point or a specific  
15 location, that can be a challenge.

16 Q. And on Page 5-1 in your report,  
17 the last full paragraph, it starts with  
18 "Given."

19 Do you see that?

20 A. Yes.

21 Q. And it says "Given these  
22 challenges, it is important to qualitatively  
23 assess the overall behavior of the simulated  
24 plume in addition to quantitatively analyzing  
25 the differences in simulated and observed

1       concentrations at specific times and  
2       locations."

3                     Did I read that correctly?

4       A.       Yes.

5       Q.       And I saw you highlighted  
6       again. Did you highlight what I read out  
7       loud?

8       A.       Yes, yep.

9       Q.       Did you highlight anything  
10      else?

11      A.       No.

12      Q.       And so is my understanding that  
13      in order to assess the overall plume  
14      behavior, you overlaid the residual area --  
15      errors for the observation points with plume  
16      maps at multiple model layers; is that right?

17      A.       Yeah. And that's in that  
18      report in the end.

19      Q.       And would it be -- and it --  
20      you did that to look to see if the trends in  
21      how the plume moved were similar?

22      A.       Basically to -- to fulfill this  
23      qualitative assessment.

24      Q.       Okay. What specifically were  
25      you looking for, for that qualitative

1 assessment?

2 A. Looking at the shape of the  
3 plume and the -- the concentrations that --  
4 from the observations and where they fell  
5 within those different layers within the  
6 plume or without the plume -- you know,  
7 outside of the plume.

8 Q. Okay. Is it correct that you  
9 were looking to see if, like, the shape of  
10 the plume moved in the same way as -- moved  
11 in the same way?

12 A. In the same way as what?

13 Q. So when you -- it sounded like  
14 you said you were looking at, like, the shape  
15 of the plume, right, as one of the -- for  
16 the -- part of the qualitative assessment?

17 A. No. The qualitative is the --  
18 the shape of the plume compared to the  
19 observation points and where they are and  
20 what their -- how -- how well the computed  
21 versus observed plotted together to help us  
22 understand that qualitatively.

23 Q. Okay. How -- what were you  
24 looking for to see if it was a close match?

25 A. If you look at the figures,

1       we're looking at each of those observation  
2       points and what their mean error is and where  
3       they are in relationship to the plume.

4           Q.        Okay. Would -- to do this kind  
5       of qualitative assessment, would you be  
6       looking to see if the simulated and observed  
7       datas over three months, for example, both  
8       increased and then the next three months both  
9       decreased?

10          A.        No.

11          Q.        Okay. How would you compare  
12       that then?

13          A.        Just -- well, what we did in  
14       the report is we looked at different times  
15       for different model layers where the  
16       observation points were and then plotted that  
17       up and then looked at those at the different  
18       times and at the different layers and how  
19       well they -- how well they matched.

20          Q.        And by "matched" do you mean  
21       whether the concentration result was close or  
22       do you mean something else?

23          A.        The residual. The difference  
24       between the computed versus observed and  
25       where it was located in regards to the -- the

1 plume extents.

2 Q. In your rebuttal report, you  
3 discussed Dr. Spiliotopoulos' critiques of  
4 your qualitative assessment; right?

5 A. Correct.

6 Q. And you would agree that data  
7 are not available to evaluate whether the  
8 overall extents of the simulated plume are  
9 realistic?

10 MS. BAUGHMAN: Objection.

11 Form.

12 THE WITNESS: Can you ask that  
13 question again.

14 Q. BY MS. SILVERSTEIN: Sure.

15 Is there data available to  
16 evaluate whether the extent of the simulated  
17 plume is realistic?

18 MS. BAUGHMAN: Objection.

19 Form.

20 THE WITNESS: No.

21 Q. BY MS. SILVERSTEIN: And you  
22 believe that it's okay to not have  
23 observations of the plume covering the entire  
24 modeling domain; right?

25 A. As I said earlier, you want as

1       much data as possible and then you have to --  
2       you have to work with what data you have.

3           Q.       Would it be impractical --  
4       impractical to have observations for the  
5       entire modeling domain?

6           A.       Like every foot, or what?

7           Q.       Sure.

8           A.       Every foot seems impractical to  
9       me.

10          Q.       Okay. And what would you  
11       consider having enough observations to draw a  
12       comparison?

13          A.       Whatever you --

14                 MS. BAUGHMAN: Objection.  
15                 Form.

16                 THE WITNESS: -- can get.  
17                 Whatever you can get.

18          Q.       BY MS. SILVERSTEIN: Would you  
19       consider it enough if you only had one  
20       observation?

21                 MS. BAUGHMAN: Objection.  
22                 Form.

23                 Enough for what? And comparing  
24       what to what? I don't understand the  
25       question. Object to the form.

1                   THE WITNESS: Yeah, can you  
2                   explain?

3                   Q.         BY MS. SILVERSTEIN: Sure.

4                   You're talking about comparing  
5                   the simulated data to the model data to see  
6                   if it is a good match; right?

7                   A.         On the -- on the qualitative?

8                   Q.         On the qualitative.

9                   A.         Correct.

10                  Q.         Okay. If you only had one  
11                  observed data point, would you be able to  
12                  determine whether or not the simulated data  
13                  was a good match?

14                  A.         It would be more difficult.

15                  Q.         Why would it be more difficult?

16                  A.         Because you're basing your  
17                  assumptions on one single location.

18                  Q.         Okay. I want to go through  
19                  your rebuttal report to Figure A5.

20                  Did you create this figure?

21                  A.         My -- my staff did.

22                  Q.         What does this figure show?

23                  A.         This shows for June 1997 we're  
24                  looking at Model Layer 1 and 3 and 5, and  
25                  we're plotting the PCE concentrations for all

1       of the model layer cells in each of those  
2       three layers as depicted by the green, blue,  
3       orange, red, and brown color; and then  
4       superimposed on that are the observation  
5       points for each of those three layers.

6                  And we colored those individual  
7       observation points either green, yellow, red,  
8       or purple based on what the absolute error  
9       was between the computed versus observed for  
10      that particular location.

11               Q.       Model 1 is on the -- is the  
12      left-hand side square or --

13               A.       Correct.

14               Q.       -- rectangle?

15               A.       Correct.

16               Q.       Okay.

17               MS. BAUGHMAN: It's Model  
18      Layer 1.

19               Q.       BY MS. SILVERSTEIN: ABC  
20      Cleaners is identified on this map as the red  
21      square?

22               A.       That's correct.

23               Q.       Okay. How did the -- what was  
24      the direction of the groundwater flow on this  
25      map?

1           A.        You can infer that by the blue  
2       lines, which are what we call the piezometric  
3       or the -- the groundwater contours. So in  
4       this, it's going in a southeastern direction,  
5       more or less.

6           Q.        Okay.

7           A.        The flow would go basically  
8       perpendicular to those blue lines.

9           Q.        Okay. And when you say "a  
10      southeastern direction," so that I make sure  
11      that I'm oriented correctly, the top --

12       A.        This is going north.

13       Q.        -- would be north; right?

14       A.        Correct.

15       Q.        And so southeastern direction  
16      would be like in the direction towards the  
17      left-hand corner; is that right?

18       A.        No. The bottom right-hand  
19      corner.

20       Q.        The bottom right-hand corner.  
21      I had that right in my brain and said it  
22      out -- wrong out loud.

23       A.        That's okay.

24       Q.        Okay. Southeast would be going  
25      towards the bottom right-hand corner?

1           A.        Correct.

2           Q.        Okay. And some of the samples  
3        were taken, like, upgradient or to the  
4        northwest of ABC Cleaners; is that right?

5           A.        Correct. Like S-11 or S-1 or  
6        S-6.

7           Q.        Under what conditions would  
8        contaminants travel upgradient?

9           A.        Generally, you only see that  
10      under numerical dispersion or dispersion  
11      phenomenon. So when -- and -- and diffusion,  
12      but that's really small, so you can get  
13      contaminants moving upgradient due to  
14      dispersion.

15          Q.        Okay.

16          A.        And you can kind of see that in  
17      this case because you can see that there's  
18      contours. The blue and the green are  
19      upgradient from the ABC location.

20          Q.        Okay. So when I say -- like,  
21      wonder what conditions could contamination  
22      travel upgradient, would you look, for  
23      example, at, like, the soil conditions?

24          A.        Sure, that plays a part in it.

25          Q.        Okay. And would you look at

1           the precipitation in the area?

2           A.       That doesn't really have  
3           anything -- that doesn't.

4           Q.       Okay. When you're looking --  
5           when you say the soil could play a role in  
6           it, are there other factors in a site that  
7           would play a role in whether a contamination  
8           travels upgradient?

9           A.       No. In -- it -- it's just --  
10          it's a component of fate and transport, and  
11          so if you're going to model it, then you're  
12          going to look at the plume characteristics,  
13          generally, is what you're going to look at.  
14          So I'm sure the soil, the ma -- soil matrix  
15          plays a part in it, but --

16          Q.       Okay.

17          A.       -- it's just a phenomenon  
18          that -- that -- how contaminants travel in  
19          the ground.

20          Q.       Okay.

21          A.       But the vast majority travels  
22          downgradient because it's carried by the  
23          water.

24          Q.       How far upgradient would PCE be  
25          able to travel?

1           A.       It's totally going to be  
2 site-dependent.

3           Q.        Okay. Did you investigate the  
4 site conditions to determine how far  
5 upgradient PCE could travel in -- at the --  
6 in Tarawa Terrace?

7           A.       We did not do anything with the  
8 dispersion coefficients or -- we didn't  
9 change any of that or look into it or  
10 evaluate it or critique it.

11          Q.        Okay. Do you know how many  
12 samples were taken from wells or locations  
13 upgradient from ABC Cleaners?

14          A.       I could look because that  
15 would -- that's in the table. So I could  
16 count them, but that would be -- that would  
17 be part of the table here of the  
18 concentrations over time, so I don't know  
19 that number -- specific number offhand.

20          Q.        Okay. Would a groundwater  
21 model generally account for the direction of  
22 groundwater flow?

23                   MS. BAUGHMAN: Objection to  
24 form.

25                   THE WITNESS: The -- the model,

1           the -- based on your boundary  
2           conditions and stresses, would  
3           determine the groundwater flow.

4           Q.       BY MS. SILVERSTEIN: Okay. And  
5           does that include which direction the  
6           groundwater is flowing?

7           A.       Yeah. The gradient, yeah.

8           Q.       Okay. I want to go to  
9           Figure A9. And this model -- this figure --  
10          well, first, did you create this figure?

11          A.       My staff did.

12          Q.       Okay. This figure shows the  
13          simulated PCE concentrations for three model  
14          layers, Layer 1, Layer 3, and Layer 5,  
15          compared to measured values; is that right?

16          A.       Yeah, for March 2008.

17          Q.       And it looks like Well C5 is  
18          towards the middle of the simulated PCE  
19          plume; is that right?

20          A.       In Layer 3?

21          Q.       In Layer 3.

22          A.       Yes.

23          Q.       Well C5's observed  
24          concentrations were all below the detection  
25          limit; right?

1           A.       I'd have to look at the  
2 documents, but --

3           Q.       Sure. If you turn to rebuttal  
4 Table A1.

5           A.       Okay.

6           Q.       The PCE observed concentration  
7 value for Well C5 is below the detection  
8 limit.

9           A.       Okay.

10          Q.       Is that correct?

11          A.       That's correct.

12          Q.       But the simulated -- the  
13 calibrated model simulated high PCE  
14 concentrations for monitoring Well C5; is  
15 that right?

16          A.       For the cell, the model cell  
17 that C5 was located in, correct.

18          Q.       And the -- your extended model  
19 or proposed audit also simulated high PCE  
20 values for monitoring Well C5; correct?

21          A.       Yeah. These are our -- these  
22 are our results in Table A1.

23          Q.       How -- can you explain how that  
24 discrepancy would occur between the -- the  
25 observed data and the simulated results for

1 Well C5?

2 A. Yeah. In this case -- in this  
3 particular case it could be a variety of  
4 different reasons, but I would say that this  
5 is a great case by looking at Model Layer 1  
6 and Model Layer 3 that it is difficult to  
7 match all of your observations. And in this  
8 particular case, for C5 where the plume,  
9 where the model's predicting the plume, it  
10 does -- it did not match that well, and there  
11 could be different reasons for that.

12 Q. When you say there could be  
13 different reasons, what reasons could there  
14 be?

15 A. Just a heterogeneity of the  
16 system could cause the contaminant to flow  
17 and not -- not actually go to where C5 was at  
18 that exact little spot. That would be one --  
19 one answer.

20 Q. Okay. Are there other reasons?

21 A. Again, we talked about earlier  
22 about sampling errors. I could have taken a  
23 sample and didn't follow protocol. I sent  
24 the wrong sample to the lab. The lab did  
25 the -- ran the wrong analysis. There's a

1 variety of different things that could happen  
2 for -- for -- for C5.

3 Q. Okay. So would you agree that  
4 in water modeling, you want to keep the model  
5 simple enough to be manageable and useful but  
6 complex enough to be representative?

7 A. Correct. That's generally the  
8 idea.

9 Q. And so complexity should be  
10 built in as needed in that case?

11 A. To the extent that you have  
12 data to support it.

13 Q. And you'd agree that in some  
14 situations, multiple sets of model input  
15 parameters can calibrate to a single set of  
16 observed data; right?

17 MS. BAUGHMAN: Objection.

18 Form.

19 THE WITNESS: Yes.

20 Q. BY MS. SILVERSTEIN: And if  
21 multiple sets of model input parameters can  
22 calibrate to a single set of observed data,  
23 that would be nonuniqueness?

24 A. That is correct. That's the  
25 word we use.

1           Q.        Okay. When a model is  
2    nonunique, that means that it may not be the  
3    only valid model; right?

4           A.        That's one interpretation.

5           Q.        If there are multiple model  
6    input parameters that can fit the scenes that  
7    have observed data, it could make it  
8    difficult to determine which set of  
9    parameters is -- accurately reflects the real  
10   world; right?

11          A.        Yes, that's possible.

12          Q.        To increase your confidence  
13    that a model accurately reflects the real  
14    world, you want it to be more unique; would  
15    that be fair to say?

16              MS. BAUGHMAN: Objection.

17              Form.

18              THE WITNESS: Ideally, yes.

19          Q.        BY MS. SILVERSTEIN: One way  
20    that you can make a model more unique is to  
21    use more site-specific data for the  
22    parameters; is that right?

23          A.        Additional observation data  
24    helps that, yes.

25          Q.        And that additional observation

1       data could be in terms of concentration  
2       sample results or other known information  
3       about the location of the groundwater?

4           A.        Correct.

5           Q.        You'd agree that it -- it's  
6       impossible to fully characterize and  
7       incorporate all parameters and complexities  
8       of a real aquifer system into a computer  
9       model?

10          A.        Yes.

11          Q.        Site-specific data means  
12       real-world data sets from the location you're  
13       modeling; right?

14          A.        Correct.

15          Q.        And ATSDR had no site-specific  
16       data for estimating the distribution  
17       coefficient; is that right?

18                   MS. BAUGHMAN: Objection.

19                   Form. Foundation.

20                   THE WITNESS: I don't -- I  
21       don't know.

22          Q.        BY MS. SILVERSTEIN: Do you  
23       know -- are you aware that ATSDR identified  
24       the -- a distribution coefficient by  
25       reviewing the literature?

1                   MS. BAUGHMAN: Objection. Form  
2                   and foundation. It's outside the  
3                   scope.

4                   THE WITNESS: I don't know.

5                   Q.         BY MS. SILVERSTEIN: You  
6                   reviewed Chapter F.

7                   A.         Yeah.

8                   Q.         Go ahead and pull back up -- I  
9                   think it's Exhibit 8. And if you could go  
10                  ahead and go to Page F28.

11                  A.         28?

12                  Q.         Yes. You would agree -- well,  
13                  I guess starting on Page F27. Go ahead and  
14                  flip back one page.

15                  And the last paragraph on Page  
16                  F20 says -- F27 says "Estimates of  
17                  retardation factors and distribution  
18                  coefficients for PCE migration within the  
19                  Tarawa Terrace aquifer or Castle Hayne  
20                  aquifer are unknown, and initial estimates  
21                  applied to the MT3DMS model were based on  
22                  literature sources"; is that right?

23                  A.         Yes.

24                  Q.         Okay. And did you just  
25                  highlight the sentence I read out loud?

1           A.       Yes.

2           Q.       Did you highlight anything  
3       else?

4           A.       No.

5           Q.       Okay. And going on to  
6       Page F28. Sorry, the last sentence of  
7       Page F27. It says "of the approximately 150  
8       samples analyzed" and "the distribution  
9       coefficient" for -- "the distribution  
10      coefficient for sand ranged from 0.25 to  
11      0.76 milliliter per gram, an averaged  
12      3.9 milliliter per gram"; is that right?

13                  MS. BAUGHMAN: Objection.

14                  Form.

15                  And take your time to read the  
16       whole paragraph if you want to --

17                  THE WITNESS: No, this is fine.

18                  MS. BAUGHMAN: -- or, you know,  
19       in the -- to context.

20                  THE WITNESS: So we've moved on  
21       from -- we're now talking about how  
22       retardation factors are created.

23                  MS. SILVERSTEIN: Yes.

24                  THE WITNESS: And not  
25       dispersion; right?

1 MS. SILVERSTEIN: Yes. We  
2 weren't talking about dispersion.

3 THE WITNESS: Okay. We're  
4 talking --

5 Q. BY MS. SILVERSTEIN: ATSDR  
6 reviewed the literature to determine both the  
7 retardation factor and the distribution  
8 coefficient; right?

9 A. Okay. Sure.

10 Q. Okay. And when they're talking  
11 about the literature that they reviewed here,  
12 they say "Retardation factors increased  
13 directly with increasing time but at a  
14 decreasing rate. Hofmann (1995) reported  
15 highly controlled laboratory column  
16 determinations of distribution coefficients  
17 for PCE migration through gravel, sand, and  
18 silt. Of the approximately 150 samples  
19 analyzed, the distribution coefficient for  
20 sand ranged from 0.25 to 0.76 milliliter per  
21 gram and averaged 0.39 milliliter per gram";  
22 is that right?

23 A. Correct.

24 Q. On the next page, it continues.  
25 "Corresponding values for silts ranged from

1       0.21 to 0.71 milliliters per gram, and  
2       averaged 0.40 milliliters per gram"; is that  
3       right?

4                  A.       Yes.

5                  Q.       The final distribution  
6       coefficient that ATSDR used was  
7       0.14 milliliters per gram?

8                          MS. BAUGHMAN: Are you talking  
9       about originally or when they  
10      corrected it?

11                  Q.       BY MS. SILVERSTEIN: According  
12      to the reports, ATSDR used a distribution  
13      coefficient of 0.14 milliliters per gram; is  
14      that right?

15                          MS. BAUGHMAN: Objection. Form  
16      and foundation.

17                          This is outside the scope.

18                          THE WITNESS: Based on what  
19      they wrote here, yes.

20                  Q.       BY MS. SILVERSTEIN: Okay.  
21      You'd agree that 0.14 milliliters per gram is  
22      lower than the -- the low end of the range  
23      identified for sands, which is  
24      0.25 milliliters per gram?

25                          MS. BAUGHMAN: Objection. Form

1           and foundation. Outside the scope of  
2           his report.

3           And as you know, this was  
4           changed and corrected by Mr. Faye.

5           It's just not reflected in the report.

6           THE WITNESS: Okay. I -- I  
7           only can go off of what's stated here.  
8           They used .14.

9           Q.       BY MS. SILVERSTEIN: Okay. And  
10          you'd agree that's lower than .25 milliliters  
11          per gram; correct?

12           MS. BAUGHMAN: Objection.

13           Form. Foundation. Outside the scope.

14           THE WITNESS: .14 is less than  
15          .25.

16           Q.       BY MS. SILVERSTEIN: It's also  
17          lower than the .21 milliliters per gram  
18          identified for silts; right?

19           MS. BAUGHMAN: Same objections.

20           THE WITNESS: .14 is lower.

21           Q.       BY MS. SILVERSTEIN: Would it  
22          be correct to say that a lower distribution  
23          coefficient means the contaminants move more  
24          quickly through the water?

25           A.       That would be the effect.

1           Q.       And if the contaminants are  
2 moving more quickly, does that mean that the  
3 contaminants would get to the well faster?

4           A.       By a small amount.

5           Q.       Did you use the same  
6 distribution coefficient that ATSDR did?

7           A.       2.9, correct. 2.93.

8           Q.       Where did you get 2.93?

9           A.       That was what -- the parameters  
10          that were in the model. We did not change  
11          the bulk density or the distribution  
12          coefficient --

13          Q.       Okay.

14          A.       -- in the original model.

15          Q.       And was that distribution  
16          coefficient consistent with the reports that  
17          ATSDR provided?

18                   MS. BAUGHMAN: Objection. Form  
19                   and foundation.

20                   THE WITNESS: We didn't -- we  
21          didn't change it, so I'm assuming that  
22          it was consistent to the effect that  
23          we got the original files, we did not  
24          change it, so whatever was in the  
25          original files.

1 Q. BY MS. SILVERSTEIN: Okay. So  
2 my question's a little bit different.

3 Is that --

4 A. Okay.

5 Q. -- consistent with the -- the  
6 reports that ATSDR produced?

7 MS. BAUGHMAN: Objection. Form  
8 and foundation and outside the scope.

9 THE WITNESS: I -- I believe  
10 the retardation factor was this 2.9  
11 that is stated here in this document.

12 Q. BY MS. SILVERSTEIN: Okay. But  
13 for the distribution coefficient, which my  
14 understanding is the distribution coefficient  
15 is part of the retardation factor?

16 A. It's a -- it's one of the  
17 variables, and so in the model, the  
18 distribution coefficient is this  
19 0.00005 cubic feet per gram.

20 Q. Okay.

21 A. That's the number that's in the  
22 model.

23 Q. Okay. You can go ahead and set  
24 Chapter F aside.

25 You'd agree that ATSDR selected

1       biodegradation rates for the MT3DMS and  
2       TechFlow models; right?

3           A.       I'm not familiar with the  
4       TechFlow model at all.

5           Q.       Okay.

6           A.       But, yes, biodegradation rate  
7       was applied.

8           Q.       Okay.

9           A.       And then for the MT3DMS model.

10          Q.       So, again, on Page F28 --  
11       apologies.

12          A.       You said we were done.

13          Q.       I know. I should have looked  
14       ahead at my notes.

15          A.       No worries.

16          Q.       On Page F28, do you see the  
17       header that says "Biodegradation"?

18          A.       Yes.

19          Q.       And the second -- the second  
20       full paragraph on there starts "The PCE  
21       concentrations at the water-supply Well TT-26  
22       on September 25, 1985, and July 11, 1991,  
23       were 1,100 and 350 micrograms per liter,  
24       respectively, and the elapsed time was  
25       2,151 days. Applying these data points to

1       Equation 3 yields a degradation rate of  
2       0.00053 per day"; is that right?

3           A.        Correct.

4           Q.        So the field data that ATSDR  
5       used are the two measurements from  
6       September 25, 1985, and July 11, 1991; is  
7       that right?

8                   MS. BAUGHMAN: Objection. Form  
9       and foundation.

10                  THE WITNESS: Based on the  
11       document here, yes.

12                  Q.        BY MS. SILVERSTEIN: And you're  
13       not aware of any other field data that ATSDR  
14       used to determine the biodegradation rate;  
15       right?

16                  MS. BAUGHMAN: Objection.  
17       Outside the scope, form, and  
18       foundation.

19                  THE WITNESS: Yeah, I don't  
20       know.

21                  Q.        BY MS. SILVERSTEIN: If you go  
22       a little bit further down, the sentence that  
23       starts on Page F28 and goes on to F29, it  
24       says "To the extent that migration of PCE  
25       mass toward and away from Well TT-26 occurred

1 at about equal rates from 1985 to 1991, the  
2 computed degradation rate of 0.00053 per day  
3 approximates a long-term average degradation  
4 rate. On the other hand, if a significant  
5 quantity of the PCE degraded in the vicinity  
6 of Well TT-26 was replaced by advection, then  
7 the degradation rate computed using  
8 Equation 3 is probably a minimum rate."

9 Did I read that correctly?

10 A. Yes.

11 Q. My understanding is that this  
12 means that ATSDR was -- well, my  
13 understanding is that this means that the  
14 degradation rate calculated from the field  
15 data represents a long-term average  
16 biodegradation rate at TT-26 only if the PCE  
17 mass migration was the same upgradient and  
18 downgradient; is that right?

19 MS. BAUGHMAN: Objection. Form  
20 and foundation.

21 THE WITNESS: Yeah, I'm not --  
22 I -- I couldn't -- I couldn't tell you  
23 that.

24 Q. BY MS. SILVERSTEIN: Okay. Did  
25 you look at the biodegradation rate for the

1           extended model?

2           A.       Yes. We kept it the same, from  
3       .0053. So it was .005 is what's -- it's in  
4       the model.

5           Q.       Okay. And did you consider  
6       ATSDR's statement that "To the extent the  
7       migration of PCE mass toward and away from  
8       Well TT-26 occurred at about equal rates for  
9       1985 to 1981, the computed degradation rate  
10      of .00053 per day approximates a long-term  
11      average degradation rate. On the other hand,  
12      if a significant quantity of the PCE degraded  
13      in the vicinity of Well TT-26 was replaced by  
14      advection, then the degradation rate computed  
15      using Equation 3 is probably a minimum rate."

16           Did you consider that  
17       statement?

18           A.       No. That was outside of our  
19       scope.

20           Q.       Okay. When you say outside of  
21       that -- of your scope, do you mean you  
22       weren't asked to determine whether the  
23       biodegradation rate was appropriate?

24           A.       No, exactly.

25           Q.       Okay. You were asked to -- in

1       your extended simulation, did you assume that  
2       ATSDR used all the correct input?

3           A.       That is correct.

4           Q.       And you did that without  
5       analyzing or determining whether or not you  
6       agreed with those inputs?

7           A.       That is correct.

8           Q.       If the biodegradation rate were  
9       higher than what ATSDR used, would that mean  
10      that PCE degraded into TCE, then DCE, then  
11      vinyl chloride at a faster rate?

12       A.       Correct.

13       Q.       And with a higher  
14      biodegradation rate, would the PCE  
15      concentrations at TT-26 be lower?

16       A.       That's not necessarily true.

17       Q.       Could they be lower?

18       A.       Could be, yeah.

19       Q.       If the PCE concentrations at  
20      TT-26 were lower, would that mean that the  
21      PCE concentrations at the Tarawa Terrace  
22      water treatment plant were also lower?

23                  MS. BAUGHMAN: Objection.

24                  Form.

25                  THE WITNESS: It's a

1           possibility. I -- I should say that  
2           after -- after the submittal of our  
3           rebuttal report, we did look at  
4           different values of biodegradation  
5           higher and lower from what was  
6           originally used. It made very little  
7           difference.

8           Q.       BY MS. SILVERSTEIN: In looking  
9           at the different rates of biodegradation,  
10          meaning higher or lower, that -- you didn't  
11          do that before forming your opinions in your  
12          rebuttal report; right?

13          A.        No. Again, that was out of our  
14          scope, but we did look at that.

15          Q.        Did you look at that at the  
16          request of an attorney?

17          A.        Yes.

18          Q.        And whatever your findings were  
19          from looking at the different biodegradation  
20          rates did not play a role -- or did not  
21          factor into your opinions?

22          A.        No.

23          Q.        Okay. So the next sentence on  
24          Page F29, it says -- did you -- have you  
25          maintained the data that -- of your results

1       from --  
2           A.       Yes.  
3           Q.       -- the biodegradation runs?  
4           A.       Yes.  
5           Q.       Okay. We will be requesting  
6       that data.  
7           A.       Okay.  
8           Q.       What -- how did you decide how  
9       to change the biodegradation rate?  
10          A.       We were given the values to  
11      use.  
12          Q.       Okay. And by "values," do you  
13      mean the different biodegradation rates?  
14          A.       Yes.  
15          Q.       Do you know how those different  
16      biodegradation rates were determined?  
17          A.       It's my understanding they came  
18      from different -- yeah, I would say I'm not  
19      sure where they came from.  
20          Q.       Okay. So the next paragraph on  
21      Page F29, the first complete paragraph at the  
22      top says "Half-lives of PCE reported in the  
23      literature range from about 360 to 720 days,  
24      (Lucius and others 1990). Applying these  
25      half-lives to Equation 3 yields first-order

1 degradation rates ranging between .001 and  
2 0.002 per day, about twice to four times the  
3 rate computed using concentrations at" a  
4 water -- "at water-supply Well TT-26."

5 Did I read that correctly?

6 A. Yes.

7 Q. Do you know why ATSDR used the  
8 biodegradation rate calculated from two data  
9 points instead of from the literature?

10 MS. BAUGHMAN: Objection. Form  
11 and foundation and outside the scope.

12 THE WITNESS: No.

13 MS. SILVERSTEIN: Do you know  
14 how long we've been going?

15 MR. ANWAR: Almost an hour.

16 MS. SILVERSTEIN: I think this  
17 would be a good place to take a break.

18 THE WITNESS: Okay.

19 THE VIDEOGRAPHER: We're off  
20 the record. The time is 3:21.

21 (There was a break taken.)

22 THE VIDEOGRAPHER: We're back  
23 on the record. The time is 3:40.

24 This is Media Number 5.

25 Counsel may proceed.

1 Q. BY MS. SILVERSTEIN: Mr. Davis,  
2 during the break did you talk to anybody  
3 about the substance of your testimony today?

4 A. Yes. There was a little bit of  
5 confusion on my part on the retardation  
6 factor in bulk density and distribution  
7 coefficients, but the document says that a  
8 retardation factor of 2.9 was used and that's  
9 what I -- my understanding was the  
10 retardation factor that was used in our  
11 modeling.

12 Q. Is there anything in your prior  
13 testimony that you need to correct?

14 A. No.

15 Q. Would you agree that a key step  
16 in developing a groundwater model is  
17 calibrating the model?

18 A. Yes.

19 Q. And is it right that  
20 calibration means -- well, that in  
21 calibration the modeler has to adjust model  
22 parameters so that the model outputs match  
23 the field data?

24 A. Correct.

25 Q. And you'd agree that ATSDR

1       considered a water concentration value to be  
2       matched if the simulated concentration value  
3       was within plus or minus half an order of  
4       magnitude of the observed concentration;  
5       right?

6                     MS. BAUGHMAN: Objection. Form  
7       and foundation.

8                     THE WITNESS: That was their --  
9       that was what they were attempting to  
10      do.

11          Q.        BY MS. SILVERSTEIN: And you  
12      would agree that a calibration target is used  
13      because it's impractical for a groundwater  
14      simulation to exactly match the field  
15      observations?

16          MS. BAUGHMAN: Objection.  
17      Form.

18                     THE WITNESS: Yeah, generally,  
19       especially with trans- -- fate and  
20       transport models, it's very difficult  
21       to get exact match everywhere.

22          Q.        BY MS. SILVERSTEIN: When you  
23      use a calibration target -- a modeler would  
24      use a calibration target to evaluate how good  
25      of a match the simulated values are?

1 MS. BAUGHMAN: Objection.

2 Form.

3 THE WITNESS: The target just  
4 gives some guidances to how close I'm  
5 getting to match.

6 Q. BY MS. SILVERSTEIN: You said  
7 that particularly in a fate and transport  
8 model, it -- it can be difficult to get the  
9 values to match. Is that -- did I -- am I  
10 understanding that correctly?

11 A. Yes.

12 Q. Why is it difficult to get the  
13 values to match in a fate and transport  
14 model?

15 A. I'm speaking as a -- a whole to  
16 try to match all of the observation points.

17 Q. Okay.

18 A. As we discussed earlier, looked  
19 at those plumes and some are closer than  
20 others.

21 Q. Okay. And why is it difficult  
22 to get all of those simulated points to match  
23 the observed data points?

24 A. As we've written in both of our  
25 reports, you have a lot of complexities that

1 add to that; the heterogeneities in the  
2 system, the sampling, all the room for errors  
3 in the sampling and reporting. And the  
4 heterogeneities in the system make it -- make  
5 it challenging.

6 Q. Okay. Is complex subsurface  
7 conditions one of the reasons it can be  
8 challenging to have the simulated data match  
9 the observed data?

10 A. Correct.

11 Q. Does complex subsurface  
12 conditions, is that referring to things like  
13 soil heterogeneity, variations in  
14 permeability, porosity, and hydraulic  
15 conductivity?

16 A. Correct.

17 Q. Would it be fair to say that  
18 these complex subsurface conditions can't be  
19 fully captured in a groundwater model?

20 MS. BAUGHMAN: Objection.

21 Form.

22 THE WITNESS: Yes. To fully  
23 capture everywhere is very difficult.

24 Q. BY MS. SILVERSTEIN: Okay. Is  
25 it -- would it be fair to say that you

1 believe that calibration targets are  
2 subjective -- are a subjective goal in the  
3 calibration exercise?

4 MS. BAUGHMAN: You can look at  
5 what you wrote in your report if you  
6 want.

7 THE WITNESS: No, I just -- I  
8 just wanted to make sure that you --

9 MS. BAUGHMAN: Object to the  
10 form.

11 THE WITNESS: -- that you had a  
12 chance.

13 Okay. Can you repeat the  
14 question.

15 Q. BY MS. SILVERSTEIN: Sure.

16 Is it your opinion that  
17 calibration targets are -- represent a  
18 subjective goal for the calibration process?

19 MS. BAUGHMAN: Objection.  
20 Form.

21 THE WITNESS: Yes.

22 Q. BY MS. SILVERSTEIN: And is it  
23 your opinion that whether or not the  
24 calibration target is met is a secondary  
25 concern?

1 MS. BAUGHMAN: Objection to  
2 form.

3 THE WITNESS: A section -- a  
4 secondary -- I'm not sure I  
5 understand.

6 Q. BY MS. SILVERSTEIN: Sure. If  
7 you could turn to Page 3-7 of your rebuttal  
8 report.

9 The -- there's a paragraph on  
10 Page 3-7 that starts on the prior page.  
11 That's where I'm looking.

12 The last sentence of that  
13 paragraph says -- which is on Page 3-7, says  
14 "Whether or not the calibration target was  
15 met is generally a secondary concern"; is  
16 that right?

17 A. Oh, okay. Right here.

18 Yes, I -- I would agree with  
19 that statement.

20 Q. Okay. And what did you  
21 highlight on Page 3-6?

22 A. Oh, just the -- where you're  
23 starting the "Therefore, our calibration  
24 target is ultimately a subjective 'goal'" --  
25 where you started reading.

1           Q.       And you would agree that plus  
2       or minus half an -- or .5 half an order of  
3       magnitude is the calibration target that  
4       ATSDR used?

5           A.       That's my understanding.

6           Q.       You -- is it your belief that  
7       the calibration target of plus or minus half  
8       an order of magnitude used by ATSDR was  
9       arbitrary?

10              MS. BAUGHMAN: Object to the  
11             form.

12              THE WITNESS: It's my  
13             understanding that they had a basis  
14             described in -- in one of these  
15             reports of why they picked that.

16              Q.       BY MS. SILVERSTEIN: Okay. If  
17       you could go ahead and look at the bottom of  
18       Page 3-8.

19              You said "In this case, even  
20       though the model was calibrated and later  
21       used as a predictive tool (Davis 2007) no  
22       calibration target was ever established or  
23       used to gauge the accuracy of the model,  
24       consistent with our point above that  
25       calibration targets are generally arbitrary";

1       is that right?

2           A.       That's correct. Yeah, I'm --  
3       I -- I stand by that statement.

4           Q.       Okay. And do you believe that  
5       ATSDR's calibration target was arbitrary?

6           A.       Yes. I mean, I'm -- the  
7       targets are generally arbitrary, as we stated  
8       in our report.

9           Q.       You would agree that many of  
10      the post-audit extended model simulated  
11      versus observed PCE values fall outside the  
12      plus or minus half an order of magnitude  
13      calibration target?

14                  MS. BAUGHMAN: Objection. Form  
15      and foundation.

16                  THE WITNESS: That is correct,  
17      but I would add that where it mattered  
18      the most at TT-26, it was a very good  
19      fit.

20                  Q.       BY MS. SILVERSTEIN: And you  
21      thought that ATSDR's calibration target was  
22      too narrow to evaluate the post-audit; is  
23      that right?

24                  A.       Too narrow? I don't believe we  
25      said it was too narrow.

1           Q.        Okay. You mentioned a minute  
2       ago that where it mattered for Well TT-26,  
3       the calibration target was a good match; is  
4       that right?

5           A.        That is correct.

6           Q.        Where in your report or  
7       rebuttal report do you state that?

8           A.        I would have to look.

9                   And we plotted -- you know, we  
10      created Figure 8, you know, that -- that used  
11      TT-26, and then we say, you know, here the  
12      results are presented in Appendix A  
13      and -- and then we talked about the  
14      differences in what we updated with the  
15      model. And I don't know if we -- if we said  
16      specifically about TT-26 --

17           Q.        Okay.

18           A.        -- and that fit.

19           Q.        Did you have contaminant  
20      concentrations at TT-26 for 1995 to 2008 to  
21      use in your post-audit?

22           A.        No.

23           Q.        I want to go to Chapter A,  
24      Page A26.

25           A.        26?

1 Q. Yes.

2 And looking at on the left-hand  
3 side at that block of text, it says "For the  
4 nondetect sample data, the upper calibration  
5 target was selected as the detection limit  
6 for the sample (Tables A9 and A10)."

7 MS. BAUGHMAN: I'm sorry, I've  
8 gotten lost. Where -- where are we  
9 again?

10 MS. SILVERSTEIN: We are on  
11 Page A26.

12 MS. BAUGHMAN: Of?

13 MS. SILVERSTEIN: Of Chapter A.

14 THE WITNESS: For the nondetect  
15 sample data? Okay.

16 MS. BAUGHMAN: Sometimes hard  
17 to jump around between all these  
18 different exhibits. Okay. All right.

19 Q. BY MS. SILVERSTEIN: On  
20 Page A26 on the left-hand side, that block of  
21 text, it says "For the nondetect sample data,  
22 the upper calibration target was selected as  
23 the detection limit for the sample (Tables A9  
24 and A10), and the lower calibration target  
25 was selected as 1 microgram per liter."

1           A.        Okay.

2           Q.        Does that mean that nondetects  
3        were sent -- set at 1 microgram per liter for  
4        the calibration target?

5           A.        For -- for the effort they did,  
6        I'm not -- I don't know.

7           Q.        Okay. You don't know what  
8        ATSDR set the nondetects as?

9           A.        No.

10          Q.        If you could turn back to  
11        Page A25. On the left-hand column, the last  
12        paragraph says "Water-supply well data  
13        included 17 of 36 samples reported as  
14        nondetect (Table A9) and these samples were  
15        not used in the computation of the geometric  
16        bias."

17                  Did I read that correctly?

18          A.        Yes.

19          Q.        And then if you look in the  
20        right-hand column, the second paragraph from  
21        the bottom, it says "For the Tarawa Terrace  
22        water treatment plant, 15 of 25 samples were  
23        recorded as nondetect (Table A10). The  
24        nondetect samples were not used in the  
25        computation of the geometric bias."

1                   Did I read that correctly?

2                   A.       Yes.

3                   Q.       Does that mean that ATSDR  
4       didn't use nondetect samples to calculate the  
5       geometric bias?

6                   MS. BAUGHMAN: Objection. Form  
7       and foundation. Outside the scope.

8                   THE WITNESS: I -- I would  
9       assume that they didn't since that's  
10      what it says.

11                  Q.       BY MS. SILVERSTEIN: And does  
12      that mean that ATSDR did not consider  
13      nondetect samples in its assessment of the  
14      calibration of the Tarawa Terrace fate and  
15      transport and mixing models for PCE?

16                  MS. BAUGHMAN: Objection.  
17       Form. Foundation.

18                  THE WITNESS: I don't know.

19                  Q.       BY MS. SILVERSTEIN: You would  
20      agree that ATSDR used only 17 of 36 well  
21      samples in its geometric bias calculation  
22      used to assess calibration; is that right?

23                  A.       That is correct.

24                  Q.       And you'd agree that ATSDR used  
25      only 15 of 25 samples in its geometric bias

1 calculation to assess the calibration of the  
2 mixing model; is that right?

3 A. Correct.

4 Q. Okay. I want to turn to  
5 Chapter F on Page F33.

6 A. 33?

7 Q. Yes.

8 Okay. That first paragraph  
9 that is continuing on Page F33, I want to  
10 look at the last sentence. It says "Both  
11 results indicate that simulated PCE  
12 concentrations moderately to substantially  
13 overpredicted observed concentrations at  
14 water supply wells"; is that correct?

15 A. That's what it says. But I --  
16 again, I would point out that where the  
17 concentrations were high, like if you look at  
18 Figure F12 where the concentrations were  
19 high, the model did a very good job at  
20 matching.

21 Q. Even though ATSDR stated that  
22 the results indicate the simulated PCE  
23 concentrations moderately to substantially  
24 overpredict observed concentrations; is that  
25 right?

1           A.        Correct.

2           Q.        And you would agree that your  
3        extended simulation model confirms that  
4        ATSDR's model overpredicted observed  
5        concentrations at water supply wells?

6           MS. BAUGHMAN: Objection to  
7        form.

8           THE WITNESS: I -- I would say  
9        our extended model showed that it --  
10       that it was a better -- better fit.

11        Still a little bit overpredicting, but  
12       better.

13        Q.        BY MS. SILVERSTEIN: I'm sorry,  
14       what was a better fit?

15        A.        The extended model and the  
16       observation data that was -- that was  
17       incorporated.

18        Q.        Okay. So you would say that  
19       the extended model was a better fit than the  
20       original model?

21        A.        Correct.

22        Q.        And is it your opinion that  
23       ATSDR's model does not do a good job at  
24       predicting concentrations when the observed  
25       concentrations are low?

1 MS. BAUGHMAN: Objection.

2 Form.

3 THE WITNESS: That's -- that's  
4 what this Figure F12 would -- would  
5 suggest.

6 Q. BY MS. SILVERSTEIN: Okay.

7 Okay. On -- on Page F33, I want to take a  
8 moment -- minute to look at Table F13.  
9 Table F13 shows the simulated and observed  
10 tetrachloroethylene or PCE concentrations at  
11 water supply wells and calibration target  
12 range at Tarawa Terrace and vicinity,  
13 U.S. Marine Corps Base Camp Lejeune,  
14 North Carolina; is that right?

15 A. Correct.

16 Q. And you would agree that for  
17 Well TT-23, ATSDR had 11 samples for  
18 calibration; is that right?

19 A. Correct.

20 Q. And in all 11 of those samples,  
21 ATSDR's model overpredicted the PCE  
22 concentrations; right?

23 A. Correct.

24 Q. And you would agree that 10 of  
25 those 11 data points failed to meet ATSDR's

1 calibration target of plus or minus half an  
2 order of magnitude?

3 A. Correct.

4 Q. For Well TT-26, ATSDR had eight  
5 samples?

6 A. Correct.

7 Q. And you'd agree that five of  
8 the eight samples overpredicted PCE  
9 concentrations; right?

10 A. Yes. But I would also point  
11 out that three of those samples were within  
12 either the same day or close to the same  
13 time.

14 Q. Okay. So that, yes, that --

15 A. Yes.

16 Q. -- five of the eight samples at  
17 TT-26 overpredicted PCE concentrations?

18 MS. BAUGHMAN: Objection.

19 Form. Asked and answered.

20 THE WITNESS: Yes.

21 Q. BY MS. SILVERSTEIN: And you'd  
22 agree that for Well TT-25, there -- ATSDR  
23 again had eight samples for model  
24 calibration?

25 A. Yes.

1           Q.       And of those eight samples, you  
2       would -- at Well TT-25, you would agree that  
3       six of them overpredicted the PCE  
4       concentrations; right?

5           A.       Yes.

6           Q.       Okay. I want to go back to  
7       Chapter A. I know we're talking about things  
8       that are discussed in multiple chapters. If  
9       you could go to Page A93.

10              Are you on Page A93?

11           A.       Yes.

12           Q.       Okay. A93 has Appendix A2,  
13       which is the simulated tetrachloroethylene  
14       and its degradation byproducts and finished  
15       water at Tarawa Terrace water treatment plant  
16       January 1951 to March 1987, continued; is  
17       that right?

18           A.       Correct.

19           Q.       You would agree that after  
20       Well TT-26 shut down, there were no PCE  
21       detections?

22           A.       Are you asking me to -- from a  
23       different or from this table?

24           Q.       So based on your review of the  
25       records, are you aware of any PCE detections

1       in Well TT-26 after Well TT-26 shut down?

2                   MS. BAUGHMAN: Objection.

3                   Form.

4                   I don't think you meant to say  
5                   that. You might want to rephrase it.

6                   It didn't make sense.

7                   THE WITNESS: Can you ask the  
8                   question again?

9                   Q.        BY MS. SILVERSTEIN: Sure.

10                  Are you aware of any PCE  
11                  detections in Well TT-26 after it went out of  
12                  service?

13                  MS. BAUGHMAN: Objection.

14                  Form.

15                  THE WITNESS: I'm not aware.

16                  Q.        BY MS. SILVERSTEIN: Is your  
17                  understanding that ATSDR modeled PCE  
18                  concentrations using MT3DMS above the 10 PPB  
19                  detection limit? Is that -- is that fair?

20                  A.        I'm not sure what you're  
21                  asking.

22                  Q.        Okay. Did ATSDR model PCE  
23                  concentrations using MT3DMS for TT-26 after  
24                  it shut down above the detection limit?

25                  MS. BAUGHMAN: Objection.

1                   Form.

2                   THE WITNESS: I mean, they  
3                   continued the model until 1994, the  
4                   end of 1994, so the contaminants were  
5                   continuing to move in the aquifers  
6                   through the -- through that time.

7                   MS. SILVERSTEIN: Okay.

8                   THE WITNESS: Even though TT-26  
9                   was not pumping.

10                  Q.         BY MS. SILVERSTEIN: Okay. Are  
11                  you aware of any sample results showing above  
12                  the detection limit for Well TT-26 after it  
13                  shut down?

14                  A.         I'm not aware.

15                  MS. BAUGHMAN: Objection.

16                  Form.

17                  Q.         BY MS. SILVERSTEIN: Would it  
18                  be -- would you agree that model validation  
19                  is part of the model development process?

20                  MS. BAUGHMAN: Objection.

21                  Form.

22                  THE WITNESS: What do you mean  
23                  by "model validation"?

24                  Q.         BY MS. SILVERSTEIN: Sure.

25                  When you're creating a -- a

1 groundwater model, do you do anything to  
2 validate the results of your model?

3 MS. BAUGHMAN: Objection.

4 Form.

5 THE WITNESS: Sometimes.

6 Q. BY MS. SILVERSTEIN: Okay.

7 Would it be fair to say that when determining  
8 how accurate a model is, you can look to  
9 either invalidate or validate a model?

10 MS. BAUGHMAN: Objection.

11 Form.

12 THE WITNESS: No, I don't.

13 Q. BY MS. SILVERSTEIN: Okay. So  
14 is it your opinion that there's no  
15 significant evidence that invalidates the  
16 analyses performed by ATSDR in the original  
17 model?

18 A. Okay. Sorry. Can you repeat  
19 that one more time?

20 MS. BAUGHMAN: You're reading  
21 from his report; right?

22 MS. SILVERSTEIN: I'm asking  
23 him a question.

24 Q. Are you aware --

25 MS. BAUGHMAN: About an opinion

1           of his report.

2           MS. SILVERSTEIN: Sure. And  
3           he's welcome to reference his  
4           opinions.

5           Q.        But are you aware of anything  
6           that invalidates -- of any evidence that  
7           invalidates ATSDR's analysis of the original  
8           model?

9           A.        No.

10          Q.        Okay. Would it be fair to say  
11           that evidence that invalidates a model is  
12           different than evidence that validates the  
13           accuracy of a model?

14          A.        I guess --

15           MS. BAUGHMAN: Objection.  
16           Form.

17           THE WITNESS: I guess I've  
18           never heard of coming up with evidence  
19           that invalidates a model.

20          Q.        BY MS. SILVERSTEIN: Okay.  
21          You've never heard of evidence that  
22           invalidates a model. How, then, would you be  
23           able to determine whether the model results  
24           are accurate?

25          A.        Through the calibration

1 exercise, or are you talking about something  
2 different?

3 Q. Is calibration the only way  
4 that you would determine whether a model  
5 accurately represents --

6 A. No, no. We -- I think you can  
7 consider the effort that we did in the  
8 post-audit strengthens the validity of the  
9 Tarawa Terrace model.

10 Q. You just said "the validity."  
11 What do you mean by "the validity"?

12 A. Or the -- what we did didn't  
13 contradict the results and conclusions that  
14 they had made about the migration of the  
15 plume.

16 Q. Okay. When you say "didn't  
17 contradict," what would indicate to you that  
18 a model did contradict? Did contradict the  
19 assumptions?

20 MS. BAUGHMAN: Objection.

21 Form.

22 THE WITNESS: If, when we  
23 extended the model, that -- that the  
24 plume behaved differently than -- than  
25 what was being observed.

1 Q. BY MS. SILVERSTEIN: Okay.

2 Can -- is the only way to do that through a  
3 post-audit?

4 MS. BAUGHMAN: Objection.

5 Form.

6 THE WITNESS: No.

7 Q. BY MS. SILVERSTEIN: Okay. If  
8 you wanted to know how well a model performed  
9 without a post-audit, what kind of analysis  
10 could you do?

11 A. You could -- you could do a  
12 validation of the existing model. That would  
13 be one way.

14 Q. What is a validation of the  
15 existing model?

16 A. That would -- that would have  
17 data that they didn't use in their original  
18 calibration that they would then plug into  
19 the original model to -- to validate the same  
20 response.

21 Q. To your knowledge, was that  
22 process done on the ATSDR model?

23 MS. BAUGHMAN: Objection. Form  
24 and foundation.

25 THE WITNESS: Not to my -- I --

1           I don't know.

2           Q.        BY MS. SILVERSTEIN: Would you  
3        agree that ATSDR used all of its real-world  
4        sampling data to calibrate its original  
5        model?

6           MS. BAUGHMAN: Objection.

7           Form. Foundation.

8           THE WITNESS: That's my  
9        understanding.

10          MS. SILVERSTEIN: I'm handing  
11        you Exhibit 12.

12          (Exhibit 12 was marked for identification.)

13          Q.        BY MS. SILVERSTEIN: I handed  
14        you Exhibit 12, which is titled "Ground-Water  
15        Models: Validate or Invalidate."

16          Do you see that title?

17          A.        Yes.

18          Q.        And it says by it "J.D.  
19        Bredehoeft" and "L.F. Konikow."

20          Do you see that?

21          A.        Yep.

22          Q.        Are you familiar with J.D.  
23        Bredehoeft?

24          A.        Bredehoeft, yes, I am.

25          Q.        How are you familiar with him?

1           A.       He's a respected groundwater  
2 person who I think has passed away.

3           Q.       I want to direct your attention  
4 to -- to Page 494, which is the second -- the  
5 second page in this document.

6                   Do you see the heading  
7 "Postaudits"?

8           A.       Yes.

9           Q.       It says "Several postaudits  
10 have been performed to evaluate the accuracy  
11 of predictions made using supposedly  
12 'validated' models. Compared to the number  
13 of model studies, the number of postaudits is  
14 small. There are numerous problems in  
15 examining past predictions; often the stress  
16 placed on the system was quite different from  
17 what was used in the model analysis."

18                   Did I read that correctly?

19           A.       Yes.

20           Q.       And then it continues. "The  
21 results of the current set of postaudits  
22 suggest that extrapolations into the future  
23 were rarely very accurate. There are various  
24 problems with models: the period of history  
25 match was too short to capture an important

1 element of the model, or the conceptual model  
2 was incomplete, or the parameters were not  
3 well-defined, et cetera. Our experience  
4 suggests that the models are more useful as  
5 tools used by the hydrologist to understand  
6 the system rather than as tools to predict  
7 future response. Our record of 'validating'  
8 models is not encouraging."

9                   Did I read that correctly?

10          A.        Correct.

11          Q.        You can set that aside.

12                   I guess, first, do you agree  
13 with that statement by Bredehoeft and  
14 Konikow?

15                   MS. BAUGHMAN: Objection. Form  
16 and foundation.

17                   I'm not sure which statement  
18 and I'm not sure if he's ever read the  
19 article.

20                   If you're going to answer that,  
21 I think you need to read the article  
22 first.

23                   THE WITNESS: Yeah, I would  
24 just say that I have not read this  
25 article, but they are talking about

1           extrapolations into the future, and  
2           what we're looking at is something  
3           different. We're looking in the past.  
4           We're not making predictions into the  
5           future.

6           Q.       BY MS. SILVERSTEIN: You would  
7           agree that ATSDR didn't check their model  
8           against samples for any time before 1980; is  
9           that right?

10          A.       Didn't what?

11          Q.       They didn't compare the results  
12         of their model against any samples from  
13         before 1980; is that right?

14           MS. BAUGHMAN: Objection. Form  
15         and foundation.

16           And are you talking about flow  
17         samples? Are you talking about  
18         concentration samples? It's vague as  
19         to what that question is about.

20           THE WITNESS: What specific  
21         types of samples are you referring to?

22          Q.       BY MS. SILVERSTEIN: Are you  
23         aware of any samples that you did before 1980  
24         that ATSDR compared its model against?

25          A.       Concentration samples?

1 Q. Sure, concentration samples.

2 A. I'm not aware.

3 Q. Are there any other types of  
4 samples that you're aware of that ATSDR  
5 looked at from before 1980?

6 MS. BAUGHMAN: Any types of  
7 data you mean?

8 MS. SILVERSTEIN: Other types  
9 of samples.

10 THE WITNESS: Other than  
11 concentration samples?

12 MS. SILVERSTEIN: Right.

13 THE WITNESS: Like what  
14 samples -- kind of other samples are  
15 you thinking about?

16 Q. BY MS. SILVERSTEIN: A minute  
17 ago counsel objected to me saying "samples,"  
18 saying that that was vague and it could be  
19 many different types of samples.

20 Are you aware of any other  
21 kinds of samples in addition -- besides  
22 concentration samples that ATSDR looked at  
23 before 1980?

24 MS. BAUGHMAN: For the flow  
25 model or the transport model?

1                   THE WITNESS: There's a  
2 possibility that there were -- that  
3 they used water level information that  
4 was -- that existed.

5                   Q.         BY MS. SILVERSTEIN: Are you --

6                   A.         To the extent of what that was,  
7 I don't know.

8                   Q.         You're not aware of anything  
9 that they looked at?

10                  MS. BAUGHMAN: Objection.

11                  Form. Foundation.

12                  THE WITNESS: I -- no, not --  
13 not conclusively.

14                  Q.         BY MS. SILVERSTEIN: So I  
15 think, as you've indicated, one way a modeler  
16 can evaluate the accuracy of their model is  
17 to do a post-audit; is that fair?

18                  A.         Correct.

19                  Q.         Okay. And would it be fair to  
20 say that post-audits are generally done to  
21 see if models' predictions match what  
22 happened?

23                  MS. BAUGHMAN: Objection.

24                  Form. Foundation.

25                  THE WITNESS: That -- that's

1           one -- that's one application.

2           Q.       BY MS. SILVERSTEIN: And based  
3       on a post-audit, the model would then be  
4       revised to improve future prediction?

5           MS. BAUGHMAN: Objection.

6           Form. Foundation.

7           THE WITNESS: Not necessarily.

8           Q.       BY MS. SILVERSTEIN: Okay. So  
9       you could do a post-audit and not then revise  
10      a model to prove future predictions?

11          A.       An example is the -- is our  
12      efforts.

13          Q.       Sure. Would you say -- so I'm  
14      talking about in this circumstance where a  
15      post-audit is done to see if the model  
16      accurately predicts what happens in the  
17      future. That's one way that a post-audit  
18      would be used; right?

19          A.       That is one application.

20          Q.       Okay. And in that kind of  
21      situation, would the model then be revised  
22      after the post-audit to improve future  
23      predictions?

24           MS. BAUGHMAN: Objection. Form  
25      and foundation.

1                   THE WITNESS: It's possible.

2                   Q.         BY MS. SILVERSTEIN: I want to  
3 go ahead and look at your report.

4                   A.         Which one? The rebuttal or the  
5 original?

6                   Q.         Yep. Just a second. Your  
7 rebuttal report.

8                   A.         Okay.

9                   Q.         I will come back to that in a  
10 minute.

11                  In one of your opinion -- do  
12 you hold the opinion that ATSDR's methodology  
13 was scientifically sound?

14                  A.         Yes.

15                  Q.         And do you hold the opinion  
16 that ATSDR's methodology is accepted within  
17 the scientific community?

18                  A.         Yes.

19                  Q.         Did you evaluate the  
20 methodology used by ATSDR?

21                  MS. BAUGHMAN: Objection.

22                  Form.

23                  THE WITNESS: Evaluated to the  
24 extent that we read the process that  
25 they went through.

1 Q. BY MS. SILVERSTEIN: And when  
2 you say "read the process that they went  
3 through," did you make determinations about  
4 whether their assumptions for various  
5 parameters were reliable?

6 MS. BAUGHMAN: Objection.

7 Form.

8 THE WITNESS: We assumed that  
9 the numbers that they reported in the  
10 document were reliable.

11 Q. BY MS. SILVERSTEIN: So just --  
12 just to be clear, you assumed the numbers  
13 they reported were reliable. Does that mean  
14 that you didn't -- you don't have an opinion  
15 about whether or not they used reliable  
16 processes to determine those number -- those  
17 parameters?

18 MS. BAUGHMAN: Objection.

19 Form.

20 THE WITNESS: Yeah, that was  
21 out of our scope.

22 Q. BY MS. SILVERSTEIN: Okay. So  
23 you don't have opinions about whether they  
24 used reliable processes to determine those  
25 parameters?

1 MS. BAUGHMAN: Objection.

2 Form.

3 THE WITNESS: That's correct.

4 Q. BY MS. SILVERSTEIN: In -- my  
5 understanding is that you only reviewed the  
6 Tarawa Terrace reports Chapters A, C, and F;  
7 is that right?

8 A. I believe that is correct.

9 Q. So would it be fair to say that  
10 your opinion that ATSDR's model was developed  
11 using a scientifically sound methodology is  
12 limited to the methodology discussed in  
13 Chapters A, C, and F of the Tarawa Terrace  
14 models?

15 MS. BAUGHMAN: Objection.

16 Form.

17 THE WITNESS: Yes, I think you  
18 can say that.

19 Q. BY MS. SILVERSTEIN: You said  
20 that you evaluated their methodology by  
21 reading the reports, meaning Chapters A, C,  
22 and F; is that right?

23 A. Correct.

24 Q. Is there anything else that you  
25 did to evaluate the methodology used by

1 ATSDR?

2 A. Not -- not besides running the  
3 model and looking at the results and  
4 comparing to what they did and what we did,  
5 yeah.

6 Q. Did ATSDR have well pumpage  
7 data for the period 1953 to 1987?

8 MS. BAUGHMAN: Objection.

9 Form.

10 THE WITNESS: I believe that  
11 was limited.

12 Q. BY MS. SILVERSTEIN: What do  
13 you mean "limited"?

14 A. Well, I'd have to read -- I'd  
15 have to go back and -- into the document to  
16 see exactly that -- that they said. We did  
17 not have well pumping data between 1953 and  
18 '84.

19 Q. Okay. If you want to take a  
20 look at Chapter A, Page A17.

21 A. A17?

22 Q. Yes.

23 A. Okay.

24 Q. The last paragraph on that  
25 page says "Based on epidemiological

1 considerations, historical reconstruction  
2 results were provided at monthly intervals.  
3 Ideally, these analyses require monthly  
4 groundwater pumpage data for the historical  
5 period. However, pumpage data were limited  
6 and were available on a monthly basis solely  
7 for 1978 and intermittently during the period  
8 of 1981 to 1985"; is that right?

9 A. That's correct.

10 Q. So aside from during 1978 and  
11 19- -- intermittently from 1981 to 1985,  
12 ATSDR did not have any well pumpage data for  
13 the period 1953 to 1987?

14 A. According to that -- this  
15 document, that is true.

16 Q. You said -- earlier we talked  
17 about your opinion that the errors in the  
18 post-audit are well balanced; is that right?

19 A. Better than the original model.

20 Q. Okay.

21 A. Still a little balanced high.

22 Q. And is it correct that you  
23 performed the -- ran the simulation on the  
24 post-audit twice?

25 A. Twice?

1 Q. You have two sets of results  
2 for the post-audit; is that right?

3 I can ask it differently.

4 A. Yeah.

5 Q. You did the post-audit and have  
6 the simulated concentration values in the  
7 post-audit in your initial report; right?

8 A. Correct.

9 Q. You had to rerun the post-audit  
10 for your rebuttal report; is that right?

11 A. That's correct.

12 Q. And that's because you had to  
13 correct some input errors that were  
14 highlighted by Dr. Spiliotopoulos; is that  
15 right?

16 A. Correct.

17 Q. As part of the post-audit, you  
18 calculated the mean error and mean absolute  
19 error; is that right?

20 A. Correct.

21 Q. And is my understanding that  
22 the mean error is the average difference of  
23 the residual errors; is that right?

24 A. That's correct.

25 Q. Okay. And is -- my

1 understanding is the residual error is the  
2 difference between the observed and simulated  
3 values; is that right?

4 A. Computed versus observed, yeah.

5 Q. When I say "simulated," does  
6 "simulated" mean something different than  
7 computed?

8 A. No. Same.

9 Q. Okay. So if I say "simulated,"  
10 you can just infer that I also mean --

11 A. Yes.

12 Q. -- computed and respond with  
13 whichever word you prefer?

14 A. Yes.

15 Q. And is the mean absolute error  
16 the average of the absolute value of the  
17 residual error?

18 A. Correct. Well, it's the  
19 mean -- it's the mean absolute. So each --  
20 each error is the absolute error, and then  
21 those are averaged.

22 Q. Which means that the mean error  
23 could be negative, but the mean absolute  
24 error --

25 A. Would always be positive.

1           Q.       And would a negative mean error  
2        indicate that a model underpredicts observed  
3        values?

4           A.       On average.

5           Q.       On average?

6           A.       Correct.

7           Q.       And a -- would a positive mean  
8        error indicate that, on average, a model  
9        overpredicts observed values?

10          A.       Correct.

11          Q.       And you calculated the mean  
12        error in both your initial report and your  
13        rebuttal report; is that right?

14          A.       Correct.

15          Q.       Okay. In your initial report,  
16        the mean error was 21 micrograms per liter?

17          A.       What page are you looking on?

18          Q.       On Page 5-2 under the section  
19        labeled "Monitoring Wells."

20          A.       Yes.

21          Q.       You said "Taking all values  
22        into consideration, the mean error" is --  
23        >equals 21 micrograms per liter"; is that  
24        right?

25          A.       Correct.

1           Q.       And you corrected your -- you  
2       had a new mean error in the -- in your  
3       rebuttal report; is that right?

4           A.       Correct.

5           Q.       And that was based on  
6       correcting your -- the calculations in your  
7       model?

8           A.       Correct.

9           Q.       You would agree that the mean  
10      error after you corrected the input values  
11      increased?

12          A.       Slightly. Went from 21 to 22.

13          Q.       If you could go to Page 3-11 of  
14      your rebuttal report. And looking at the  
15      last couple of sentences there, it says  
16      "Correcting the termination of the mass  
17      loading by changing it from the end of  
18      December 1983 to the end of December 1984 had  
19      a larger impact and increased the PCE  
20      concentration to some degree at most of the  
21      well locations. The average increase was  
22      27 micrograms per liter"; is that right?

23          A.       Yeah, that's correct. I -- I  
24      stand corrected. It went from 21 to 48,  
25      so...

1           Q.       And you would agree that this  
2 indicates a small high bias in the model  
3 results; right?

4           A.       Yes. Yeah.

5           Q.       You'd also agree that there  
6 were several instances in the extended model  
7 where the observed value was zero and the  
8 simulated or computed value was nonzero,  
9 higher than zero?

10          A.       That's correct.

11          Q.       There are also instances where  
12 the simulated value was zero but the observed  
13 value was nonzero; is that right?

14          A.       I believe so, yes.

15          Q.       You said a few minutes ago,  
16 maybe more than a few minutes ago, that you  
17 made corrections to the extended model based  
18 on errors that were identified by  
19 Dr. Spiliotopoulos; right?

20          A.       Correct.

21          Q.       One of those errors was a  
22 truncation error; is that right?

23          A.       Yes.

24          Q.       Meaning you had truncated the  
25 PCE values down to a lower number of

1 significant digits; right?

2 A. Correct. When -- yeah, when I  
3 exported the -- the values, they were  
4 truncated. So when we -- when we -- when I  
5 ran it the second time with the other fixes,  
6 I gave -- I gave Dr. Jones the numbers in --  
7 all significant numbers that were available  
8 from the -- from the computed results.

9 Q. Okay. And this resulted in  
10 some of the simulated PC values being higher  
11 than the observed values and others being  
12 lower than the observed values; is that  
13 right?

14 A. I can't remember if there were  
15 some that were lower, but there would --  
16 there is a chance that there were some that  
17 were higher where before in our original one,  
18 they would have just been zero.

19 Q. Okay.

20 A. But the number of higher or  
21 lower, I don't -- I don't recall how many of  
22 each.

23 Q. You also directed an error  
24 using the incorrect source termination date;  
25 is that right?

1           A.        Correct. Yeah, we fixed it  
2 from ending in 1983 to ending in 1984.

3           Q.        And you corrected an error in  
4 using the incorrect pumping rate for Well  
5 RWC-2 from March 7, 2004, to December 16,  
6 2004?

7           A.        Correct, for those nine months.

8           Q.        I want to go ahead and go back  
9 to your initial report, to the executive  
10 summary.

11                  You determined that the ATSDR's  
12 model was sufficient for -- or effectively  
13 simulated long-term trends; is that right?

14           A.        Correct.

15           Q.        What do you mean by "long  
16 term"?

17           A.        For the duration of the  
18 model -- the duration, the period that they  
19 modeled is long term.

20           Q.        Do you -- is it your opinion --  
21 well, do you have an opinion on whether or  
22 not the model could effectively simulate  
23 month-to-month trends?

24                  MS. BAUGHMAN: Objection.

25                  Form.

1                   THE WITNESS: Yes, I think it  
2 effectively modeled the month-by-month  
3 term -- terms.

4                   Q.         BY MS. SILVERSTEIN: Do you  
5 have an opinion as to whether the model  
6 effectively simulates contaminant  
7 concentrations at the wells?

8                   A.         Yes.

9                   Q.         And is it your opinion that the  
10 concentrations simulated by the model are  
11 reliable for determining what the  
12 concentration was at a specific month?

13                   MS. BAUGHMAN: Objection.

14                   Form.

15                   Do you mean at the water  
16 treatment plant?

17                   MS. SILVERSTEIN: Sure.

18                   Q.         Do you have -- is it your  
19 opinion that the models -- the simulated  
20 concentration data is reliable for  
21 determining what the concentration was at a  
22 specific month?

23                   MS. BAUGHMAN: Objection.

24                   Form.

25                   THE WITNESS: At the wells or

1           at the treatment plant or at some  
2           other location?

3           Q.       BY MS. SILVERSTEIN: Anywhere.

4           A.       Yes.

5           Q.       And where -- first, where do  
6           you state in your -- either of your reports  
7           that you have an opinion that the monthly  
8           concentration data is reliable?

9           A.       I don't believe that we were  
10          specific about a monthly time step being  
11          reliable. We didn't state that.

12          Q.       So, in other words, none of the  
13          opinions that you offer in your initial  
14          report or your rebuttal report include the  
15          opinion that the ATSDR model is reliable for  
16          determining what the concentration was at a  
17          specific month?

18          A.       Not --

19                   MS. BAUGHMAN: Objection.  
20                   Form.

21                   THE WITNESS: Not in those  
22                   specific words.

23          Q.       BY MS. SILVERSTEIN: Okay.  
24          What words in your report -- where in your  
25          reports do you believe that that opinion is

1 covered?

2 A. In our conclusions and summary  
3 about the reliability of the model that was  
4 originally developed and its applicability to  
5 what it was constructed for.

6 For example, at the end of our  
7 Executive Summary on Page V1 -- or VI. "In  
8 summary, this post-audit found that the  
9 original Tarawa Terrace groundwater model and  
10 transport models were developed using sound  
11 methodology and continue to provide reliable  
12 insights into the migration of PCE  
13 concentration [sic]."

14 MS. BAUGHMAN: Contamination.

15 THE WITNESS: Contamination.

16 Q. BY MS. SILVERSTEIN: So your  
17 opinion is that the model is reliable for  
18 determining the migration of the PCE  
19 contamination; is that fair?

20 MS. BAUGHMAN: Objection.

21 Form.

22 THE WITNESS: Yes.

23 Q. BY MS. SILVERSTEIN: Where do  
24 you say that it's your opinion that the model  
25 is reliable for determining what the

1 concentration was in a specific month?

2 A. We didn't -- we did not use  
3 those specific words.

4 Q. Okay. And it's your opinion --  
5 it's your belief that saying it's reliable  
6 for insights into the migration of PCE  
7 contamination includes reliability about what  
8 a specific concentration was?

9 A. Yes.

10 Q. What is that based on?

11 A. It's based on --

12 MS. BAUGHMAN: Objection.  
13 Form.

14 THE WITNESS: -- the  
15 observation data and the agreement of  
16 the computed values to the observation  
17 data and all of the evaluation, both  
18 quantitative and qualitative, to make  
19 that -- to make that --

20 Q. BY MS. SILVERSTEIN: Is it your  
21 opinion that ATSDR's model is reliable and  
22 accurate for determining what the specific  
23 concentration of PCE was at the Tarawa  
24 Terrace water treatment plant in 1961?

25 A. Yes.

1 Q. And why do you believe that?

2 A. Based on the original author's  
3 efforts to calibrate the model and the effort  
4 that we did in the post-audit and the looking  
5 at the observed data and how well that fit  
6 gives me that opinion that's valid for 1961.

7 Q. Earlier I showed you Exhibit 6,  
8 the ATSDR's response to criticism from the  
9 Navy.

10 Do you recall that?

11 A. What document was that in?  
12 Exhibit 6?

13 Q. Exhibit 6, yes.

14 And if you could look at the  
15 page ending in 272.

16 A. 272, okay.

17 Q. And looking at the last  
18 paragraph, it says "To address the issue of  
19 the intended use of the water-modeling  
20 results by the current ATSDR epidemiological  
21 study, the DON should be advised that a  
22 successful epidemiological study places  
23 little emphasis on the actual (absolute)  
24 estimate of concentration and, rather,  
25 emphasizes the relative level of exposure.

1       That is, exposed individuals are, in effect,  
2       ranked by exposure level and " maintained --  
3       "maintain their rank order of exposure level  
4       regardless of how far off the estimated  
5       concentration is to the 'true' (measure) PCE  
6       concentration. This rank order of exposure  
7       level is preserved regardless of whether the  
8       mean or the upper or lower 95 percent of  
9       simulated levels are used to estimate the  
10      monthly average contaminant levels. It is  
11      not the goal of the ATSDR health study to  
12      infer which health effects occur at specific  
13      PCE concentrations."

14                  Did I read that correctly?

15                  A.       Yes.

16                  Q.       Is it your understanding that  
17       ATSDR was looking to determine what the  
18       actual concentrations were at the Tarawa  
19       Terrace water treatment plant?

20                  MS. BAUGHMAN: Objection.

21                  Form.

22                  You mean "mean monthly"  
23       concentrations?

24                  MS. SILVERSTEIN: The actual  
25       mean monthly concentration.

1 MS. BAUGHMAN: Still object to  
2 form.

3 Q. BY MS. SILVERSTEIN: Is that  
4 your -- is that your understanding?

5 A. Yes.

6 Q. And is it your understanding  
7 that that -- that ATSDR was attempting to  
8 determine the actual mean monthly value at  
9 the wells even though they stated that the  
10 emphasis was on the relative level of  
11 exposure?

12 MS. BAUGHMAN: Objection. Form  
13 and foundation --

14 THE WITNESS: Who --

15 MS. BAUGHMAN: -- and asked and  
16 answered.

17 THE WITNESS: Who stated?

18 Q. BY MS. SILVERSTEIN: In the  
19 paragraph that I just read you, they stated  
20 that the emphasis was on the relative level  
21 of exposure; right?

22 MS. BAUGHMAN: Objection.  
23 Form. Foundation.

24 THE WITNESS: And -- and that  
25 is what --

1                   MS. BAUGHMAN: And asked and  
2                   answered.

3                   THE WITNESS: -- you're saying  
4                   the A -- ASTD -- ATSDR said that?

5                   MS. SILVERSTEIN: Yes.

6                   MS. BAUGHMAN: Calls for  
7                   speculation. Asked and answered.

8                   THE WITNESS: Okay. Can you  
9                   ask the question one more time?

10                  Q.           BY MS. SILVERSTEIN: Sure.

11                  ATSDR places little -- said  
12                  that they place little emphasis on the actual  
13                  absolute estimate of the concentration level;  
14                  is that right?

15                  MS. BAUGHMAN: Objection.

16                  Form. Mischaracterizes the document.

17                  And this is talking about the  
18                  intent of the epidemiology study, not  
19                  the intent of the water modeling, so  
20                  you're mischaracterizing the document.

21                  Q.           BY MS. SILVERSTEIN: Do you see  
22                  where it says that their focus was on the --  
23                  was not on the actual absolute value of the  
24                  water concentration?

25                  MS. BAUGHMAN: Objection. Form

1                   and foundation.

2                   THE WITNESS: According to  
3                   this, based on the epidemiological  
4                   study.

5                   Q.         BY MS. SILVERSTEIN: And when  
6                   you say "based on the epidemiological study,"  
7                   you understand that the epidemiological study  
8                   relied on the ATSDR water modeling results  
9                   that you reviewed in this case?

10                  MS. BAUGHMAN: Objection.

11                  Form. Foundation. This is outside  
12                  the scope.

13                  He's not giving opinions on  
14                  what the epidemiology study did or  
15                  didn't do.

16                  THE WITNESS: Yeah, I'm not  
17                  sure I understand what they're trying  
18                  to say here.

19                  Q.         BY MS. SILVERSTEIN: Are you  
20                  offering an opinion about whether or not the  
21                  ATSDR water model for Tarawa Terrace can be  
22                  used to determine a specific individual's  
23                  exposure?

24                  MS. BAUGHMAN: Objection.

25                  Form. Foundation. Outside the scope

1           of this report.

2           THE WITNESS: No.

3           MS. SILVERSTEIN: How long have  
4           we been going for?

5           MS. BAUGHMAN: It's been over  
6           an hour.

7           MS. SILVERSTEIN: Let's go  
8           ahead and take a break now, then.

9           MS. BAUGHMAN: And can you let  
10          us know how much is left of the seven  
11          hours?

12          THE VIDEOGRAPHER: We have --  
13          we're on 5:24 now.

14          MS. BAUGHMAN: Thank you.

15          THE VIDEOGRAPHER: We're off  
16          the record. The time is 4:45 -- 4:46.

17          (There was a break taken.)

18          THE VIDEOGRAPHER: We're back  
19          on the record. The time is 5:15.

20          Counsel may proceed.

21          Q.        BY MS. SILVERSTEIN: Mr. Davis,  
22          during the break did you talk to anybody  
23          about the substance of your testimony today?

24          A.        Yes, I talked to our -- our  
25          legal team.

1           Q.       And when you say "our legal  
2 team," do you mean Laura and Devin?

3           A.       Laura and Devin, correct.

4           Q.       What did you talk about  
5 regarding the substance of your testimony?

6           A.       A question that I had based on  
7 the question that you asked me about whether  
8 or not all of the data was used for the  
9 calibration of the original model.

10          Q.       Okay.

11          A.       And I -- I just need to correct  
12 my answer, because as I was thinking about it  
13 and had -- had to look at some documents in  
14 Section F, that the data for the treatment  
15 plant was not used in the calibration; it was  
16 used after the model was calibrated to verify  
17 the validity of the groundwater model, the PC  
18 concentrations.

19          Q.       And where in Chapter F are you  
20 referring to?

21          A.       It's, like, Page -- Chapter F,  
22 I believe it's 40 -- Page 42 from the Level 4  
23 calibration.

24                   Even though the word  
25 "calibration" was used here for the mixing

1 model, the original -- the parameters weren't  
2 changed based on the observed values at the  
3 treatment plant, but this data was used  
4 separately from the data that was used to  
5 calibrate the original model in the -- the  
6 Level 3 effort.

7 There's also corresponding  
8 descriptions of the same thing in Morris' and  
9 Dr. Aral's expert reports.

10 Q. Okay. So is it your  
11 understanding, then, that ATSDR used  
12 concentration data after the model was  
13 calibrated to validate the model?

14 A. To verify what the results they  
15 were getting.

16 Q. Okay. And which -- which  
17 sample data did they use to verify the  
18 results?

19 A. The -- the data that's listed  
20 in Table F14.

21 Q. Okay. And Table F14 is  
22 Computed and observed tetrachloroethylene  
23 (PCE) concentrations in water samples  
24 collected at the Tarawa Terrace water  
25 treatment plant and calibration target rate;

1       is that right?

2           A.        Correct.

3           Q.        Prior to discussing this with  
4        your -- with the legal team during the break,  
5        were you -- were you aware that ATSDR had  
6        used that data to verify?

7           A.        Yes, yeah. And then in trying  
8        to answer the questions, and you asked me did  
9        they use all of the data, then -- and I  
10      misspoke, because they didn't use this  
11      particular data in that effort.

12        Q.        They used this particular data  
13      to -- would it be right to say to look at  
14      the -- how the simulated data fit within the  
15      calibration target; is that right?

16           MS. BAUGHMAN: Objection.

17           Form.

18           THE WITNESS: They looked at  
19      this data to -- as they got the mean  
20      monthly concentrations and they  
21      compared that with what they had  
22      observed at the treatment plant.

23        Q.        BY MS. SILVERSTEIN: And they  
24      did that to look at the calibration target;  
25      is that what they were doing?

1 MS. BAUGHMAN: Objection.

2 Form.

3 THE WITNESS: No, there's no  
4 calibration targets here --

5 Q. BY MS. SILVERSTEIN: Okay. So  
6 they --

7 A. -- in this case.

8 Q. -- just were doing that to  
9 verify the data?

10 A. The validity of the data, yeah.

11 Q. Is this all of the data that  
12 ATSDR used to look at the validity of the  
13 data?

14 MS. BAUGHMAN: Objection.

15 Form. Foundation.

16 THE WITNESS: I assume, yes.  
17 The data that you're talking  
18 about that's listed in Table F14?

19 MS. SILVERSTEIN: Correct.

20 THE WITNESS: I assume that is  
21 correct.

22 Q. BY MS. SILVERSTEIN: Earlier I  
23 asked you where you got a couple different  
24 pieces of data that you used in your  
25 post-audit; for example, the pumping rate

1 data. Do you remember when I asked you those  
2 questions?

3 A. Yes, uh-huh.

4 Q. And you told me that the legal  
5 team gave you that data; is that right?

6 A. Correct.

7 Q. Who on the legal team gave you  
8 that data?

9 A. I don't recall.

10 Q. Okay. Was that data provided,  
11 like, via email?

12 A. I don't know if it was email or  
13 from, like, a secure fold -- you know,  
14 SharePoint or secure download folder. I -- I  
15 can't -- can't remember.

16 Q. Okay. And when you refer to,  
17 like, a legal team, who do you include in  
18 that -- that description?

19 MS. BAUGHMAN: I'm going to  
20 object to that. I don't think that  
21 you're allowed to know who he's  
22 communicating with on the team. I  
23 think that's confidential.

24 MS. SILVERSTEIN: I disagree.

25 I think we're allowed to know where he

1           got it. Who provided him specific  
2           data.

3           MS. BAUGHMAN: He said the  
4           legal team provided the data.

5           THE WITNESS: Yeah.

6           MS. BAUGHMAN: That's -- that's  
7           specific enough.

8           MS. SILVERSTEIN: To be clear,  
9           are you instructing him not to answer?

10          MS. BAUGHMAN: He already  
11          answered. He said he didn't know.

12          MS. SILVERSTEIN: Okay. I --

13          MS. BAUGHMAN: He doesn't  
14          remember.

15          Q.        BY MS. SILVERSTEIN: When you  
16          say "the legal team," who -- who makes up the  
17          legal team?

18          MS. BAUGHMAN: Objection. Form  
19          and foundation.

20          THE WITNESS: I don't know all  
21          of the people. I -- I would say for  
22          the vast majority of my commun - --  
23          well, all my communication has gone  
24          through these -- these two  
25          individuals.

1 Q. BY MS. SILVERSTEIN: Okay. You  
2 also mentioned earlier that you had taught  
3 courses on water modeling; is that right?

4 A. Correct.

5 Q. Where did you teach courses on  
6 water modeling?

7 A. Various locations across the  
8 world.

9 Q. When you say "various  
10 locations," do you mean at universities?

11 A. Sometimes at universities.

12 Q. Okay. What universities?

13 A. Like the University of Liege in  
14 Belgium. University -- you know, some  
15 universities, some were given at, like, in  
16 conference rooms and at -- at various places.  
17 So sometimes it happened at a hotel room,  
18 sometimes it happened at a university, so  
19 it -- it varied.

20 Q. And when you say "courses," do  
21 you mean, like, a -- a semester-long course  
22 at a university or are you referring to,  
23 like, a day or two-day long lecture?

24 A. Usually they were a week  
25 long -- a week-long course.

1           Q.        Okay.  And how many of these  
2 courses have you taught?

3           A.        Dozens, at least, if not more.  
4 Probably more than a hundred.

5           Q.        And what subject matters did  
6 you teach?

7           A.        Groundwater principles,  
8 groundwater hydrology, hydrogeology,  
9 groundwater modeling, fate and transport.  
10 All centered around groundwater hydrogeology  
11 and modeling.

12          Q.        Are these courses all listed on  
13 your resum??

14          A.        No.

15          Q.        Do you maintain a list of the  
16 courses that you've taught?

17          A.        No.

18          Q.        Okay.  Have you ever been,  
19 like, hired as a full-time professor  
20 or instructor?

21          A.        No, no.

22          Q.        Would it be fair to say that  
23 these -- that your course at University of  
24 Liege was, like, a guest lecture kind of  
25 course?

1           A.       I don't know if it would be  
2       classified as a guest lecture. We went there  
3       and people came to participate in the  
4       training course.

5           Q.       When you say "people came to  
6       participate in the training course," were  
7       these, like, university students?

8           A.       Sometimes.

9           Q.       Okay. What other kind of -- if  
10      they weren't all university students, who  
11      else took these?

12          A.       Consultants, government --  
13      government people. You know, both academia,  
14      non-academia consultants.

15          Q.       Did you prepare -- do you  
16      prepare, like, a syllabus or --

17          A.       Yes.

18          Q.       -- for these courses?

19          A.       Yes.

20          Q.       Have you maintained the  
21      syllabi?

22          A.       No.

23          Q.       Do you use -- do you have,  
24      like, a standard syllabus that you use or is  
25      it different for each course?

1           A.       It -- it varied. You know, a  
2       lot of times it was a standard -- a standard  
3       format, but sometimes it was adjusted,  
4       depending on where we -- where I was going.

5           Q.       When did you most recently  
6       teach a course on groundwater modeling?

7           A.       Probably 2009, 2010.

8           Q.       Is there a reason that you  
9       haven't taught any courses since 2009 or  
10      2010?

11          A.       My career shifted from doing  
12       training and some consulting to consulting  
13       100 percent of the time.

14          Q.       And that change was around  
15      2010?

16          A.       Yes.

17          Q.       Have you ever worked -- prior  
18       to your retention for the Camp Lejeune  
19       litigation, had you ever worked with Morris  
20       Maslia?

21          A.       No.

22          Q.       Were you familiar with  
23       Mr. Maslia at all?

24          A.       No.

25          Q.       Had you -- prior to your

1 retention for the Camp Lejeune litigation,  
2 had you ever worked with Mustafa Aral?

3 A. No.

4 Q. Were you familiar with  
5 Dr. Aral's work?

6 A. No.

7 Q. Had you ever worked with --  
8 prior to your retention for the Camp Lejeune  
9 litigation, had you ever worked with  
10 Dr. Konikow?

11 A. No, but I've known him  
12 throughout my career.

13 Q. How do you know him?

14 A. Well, most recently he was the  
15 editor of Groundwater journal, and I sit on  
16 the board of directors for the National  
17 Groundwater Association.

18 Q. Okay. And I'm not familiar  
19 with how those two organization -- the  
20 national association --

21 A. Yeah, the Groundwater journal  
22 is published by the National Groundwater  
23 Association.

24 Q. Okay. And so did you interact  
25 with Dr. Konikow in -- on your role on the

1 board?

2 A. To the extent that we would see  
3 each other at our annual meeting.

4 Q. Had you ever worked with  
5 Dr. Sabatini prior to your retention in the  
6 Camp Lejeune litigation?

7 A. No.

8 Q. Were you familiar with  
9 Dr. Sabatini?

10 A. I don't know him.

11 Q. Have you read USGS's 2004  
12 report "Guidelines for evaluating groundwater  
13 flow models"?

14 A. I'm familiar with that  
15 document. I wouldn't say that I've read it  
16 recently, but I am familiar with it.

17 Q. And in your opinion, is USGS a  
18 reliable source?

19 A. Yes.

20 MS. BAUGHMAN: Objection to  
21 form.

22 Q. BY MS. SILVERSTEIN: And did  
23 you review Dr. Konikow's report prior to  
24 submitting your rebuttal report?

25 A. His -- the only report I'm

1 aware of is his rebuttal report, which I read  
2 after our rebuttal report was submitted.

3 Q. Do you agree with Dr. Konikow's  
4 opinions?

5 A. Yes.

6 Q. Have you reviewed  
7 Dr. Sabatini's report?

8 A. Briefly. I mean, not -- not  
9 fully, yeah.

10 Q. Do you agree with  
11 Dr. Sabatini's opinions?

12 A. I don't have an opinion.

13 Q. Did you review Morris Maslia's  
14 report?

15 A. His rebuttal report?

16 Q. Did you review his initial  
17 report?

18 A. Yes.

19 Q. And do you agree with his  
20 opinions in --

21 A. Yes.

22 Q. -- his initial report?

23 Did you review Mr. Maslia's  
24 rebuttal report?

25 A. Yes.

1           Q.       Do you agree with his opinions  
2        in his rebuttal report?

3           A.       Yes.

4           Q.       And did you review Dr. Aral's  
5        report?

6           A.       Briefly, I believe.

7                     His original report?

8           Q.       Yes.

9           A.       I don't recall.

10          Q.       Do you agree with Dr. Aral's  
11        opinions?

12                     MS. BAUGHMAN: Objection.

13                     Form.

14                     THE WITNESS: It would be hard  
15        to agree to his opinions if I can't  
16        remember what they are.

17          Q.       BY MS. SILVERSTEIN: Okay. Did  
18        you -- for your rebuttal report, did you  
19        consider the expert report from Dr. Jay  
20        Brigham?

21          A.       No.

22          Q.       Did you review the report of  
23        Kyle Longley?

24          A.       No.

25          Q.       When you were preparing your

1 initial report and the rebuttal report, did  
2 you review any academic texts?

3 MS. BAUGHMAN: Other than  
4 what's cited in the reports?

5 THE WITNESS: Yeah, I don't --

6 MS. BAUGHMAN: I object to the  
7 form. He's got citations in the  
8 reports.

9 THE WITNESS: Yeah, outside of  
10 the ones that are cited, I -- I don't  
11 remember offhand if there were  
12 academic papers.

13 Q. BY MS. SILVERSTEIN: Are there  
14 any texts, meaning studies, textbooks,  
15 guidebooks that you consider to be reliable  
16 authorities in the field of groundwater  
17 modeling?

18 MS. BAUGHMAN: Objection.

19 Form. Overbroad.

20 THE WITNESS: Yeah, there's  
21 lots of books. Many that sit on my  
22 shelf.

23 Q. BY MS. SILVERSTEIN: Okay.  
24 What are some of the books that you consider  
25 to be reliable authorities in groundwater

1 modeling?

2 MS. BAUGHMAN: Object to the  
3 form.

4 Reliable for every single  
5 statement stated in each of the books?  
6 Is that what you're asking him?

7 Q. BY MS. SILVERSTEIN: If someone  
8 asked you --

9 MS. BAUGHMAN: Be careful.

10 Q. BY MS. SILVERSTEIN: -- is this  
11 a reliable authority in groundwater  
12 modeling --

13 A. Yeah.

14 Q. -- what text would you provide?

15 MS. BAUGHMAN: Objecting to the  
16 form.

17 THE WITNESS: Like the Anderson  
18 Woessner book, that's a reliable --  
19 that's a reliable book.

20 Q. BY MS. SILVERSTEIN: Are you  
21 referring to Applied Groundwater Modeling --  
22 Monitoring?

23 A. Modeling.

24 Q. Modeling, excuse me.

25 A. Yes, yeah.

1           Q.       Are you familiar with  
2 groundwater -- Modeling Groundwater Flow and  
3 Contaminant Transport by Jacob Bear and  
4 Alexander H.-D. Cheng?

5           A.       Yes.

6           Q.       Do you consider that to be a  
7 reliable authority?

8           A.       Yes.

9                   MS. BAUGHMAN: Object to the  
10 form.

11           Q.       BY MS. SILVERSTEIN: A minute  
12 ago you mentioned the Anderson text. Do you  
13 consider the 1992 version to be a reliable  
14 authority?

15                   MS. BAUGHMAN: Objection to the  
16 form.

17                   If -- if you would need to look  
18 at it first to make sure what they've  
19 stated is reliable, then don't answer.

20                   THE WITNESS: Okay. I would  
21 have to review it.

22           Q.       BY MS. SILVERSTEIN: When you  
23 said earlier that you consider the  
24 Anderson --

25           A.       Yeah.

1 Q. -- text to be reliable --

2 A. Yes.

3 Q. -- would that include the 1992  
4 and 2015 versions?

5 MS. BAUGHMAN: Objection.

6 Form.

7 THE WITNESS: Yes, I would say  
8 so.

9 Q. BY MS. SILVERSTEIN: Are you  
10 familiar with the text Guidelines for  
11 Evaluating Groundwater Flow Models by  
12 Thomas E. Reilly and Arlen W. Harbaugh?

13 A. Not sure if I've read that one.

14 Q. Okay. Are you familiar with  
15 the Standard Guide for Calibrating a  
16 Groundwater Flow Model Application by the  
17 American Society for Testing and Materials  
18 International?

19 A. I'm aware of that document.

20 Q. Do you consider that to be  
21 reliable?

22 MS. BAUGHMAN: Object to the  
23 form.

24 THE WITNESS: Yes.

25 Q. BY MS. SILVERSTEIN: Are you

1       familiar with the text Calibration and  
2       Uncertainty Analysis for Complex  
3       Environmental Models by John Doherty?

4           A.       Yes, I'm -- I'm -- I'm familiar  
5       with that document.

6           Q.       Do you consider that document  
7       to be reliable?

8           A.       Yes.

9                   MS. BAUGHMAN: Object to the  
10      form.

11                  THE WITNESS: Yes.

12           Q.       BY MS. SILVERSTEIN: Are you  
13       familiar with the work of Dr. Clement?

14                  MS. BAUGHMAN: Object to the  
15      form.

16                  THE WITNESS: Yes.

17           Q.       BY MS. SILVERSTEIN: Do you  
18       consider Dr. Clement to be an authoritative  
19       figure in groundwater modeling?

20                  MS. BAUGHMAN: Object to the  
21      form.

22                  THE WITNESS: Yes.

23           Q.       BY MS. SILVERSTEIN: Earlier I  
24       asked you about groundwater modeling projects  
25       that you had worked on. Do you remember that

1 discussion?

2 A. Yes.

3 Q. And you said that there were  
4 hundreds of projects that you had worked on  
5 that were not listed in your CV; is that  
6 right?

7 A. That's correct.

8 Q. Why are they not all listed in  
9 your CV?

10 A. Because my -- I would say  
11 because I'm a consultant and my resum? or CV  
12 gets distributed to clients and potential  
13 clients on a regular basis, and they don't  
14 need to see hundreds of pages.

15 Q. How do you determine which  
16 projects to list on your CV?

17 A. I try to find ones that are  
18 representative and current.

19 Q. By "current" do you mean ones  
20 that you've worked on in the last couple of  
21 years?

22 A. Most recent, yes.

23 Q. Okay. Do you maintain a list  
24 of all of the groundwater modeling projects  
25 you've worked on?

1           A.       No.

2           Q.        Earlier I asked you questions  
3       about a couple of the projects that you have  
4       worked on, including, I think, one for  
5       New Jersey that you said was confidential.

6                   Do you remember that?

7           A.       Yes.

8           Q.        And are you maintaining your  
9       position that you can't answer questions  
10      about that work because it's confidential?

11                  MS. BAUGHMAN: About the  
12      New Jersey one?

13                  MS. SILVERSTEIN: Yes.

14                  THE WITNESS: Yes.

15                  MS. SILVERSTEIN: Okay. We are  
16      reserving our right to seek additional  
17      information regarding the confidential  
18      projects --

19                  THE WITNESS: Sure.

20                  MS. SILVERSTEIN: -- that  
21      Mr. Davis declined to testify about.

22                  THE WITNESS: Sure.

23           Q.        BY MS. SILVERSTEIN: Earlier I  
24      also asked you if you had been involved in  
25      any personal litigation.

1                   Do you remember that?

2       A.       Yes.

3       Q.       And you said -- you said other  
4       than your divorce there wasn't anything?

5       A.       Correct.

6       Q.       Have you ever been involved or  
7       filed for bankruptcy?

8       A.       Yes.

9       Q.       And have you been involved in  
10      any creditor suits?

11      A.       No.

12                  MS. SILVERSTEIN: Okay. I  
13      don't have any more questions at this  
14      time.

15                  Thank you so much for your time  
16      today. I know it was a really long  
17      day.

18                  THE WITNESS: That's okay.

19                  Thank you.

20                  MS. BAUGHMAN: I have a few  
21      questions.

22                   EXAMINATION

23      BY MS. BAUGHMAN:

24      Q.       Okay. Just going back to  
25      question -- a topic that we were just asking

1       about where you talked about hundreds of  
2       groundwater modeling projects that you've  
3       worked on that aren't on your CV.

4                     My question about that is: Did  
5       any of those projects involve hindcasting or  
6       looking back in time to model?

7       A.       I'm -- I'm sure they did.

8       Q.       Can you -- can you give us an  
9       estimate about how many times you've done  
10      that -- that sort of a reconstruction or  
11      hindcasting of groundwater flow and  
12      contaminant transport?

13      A.       More than one, less than a  
14      hundred. I don't -- I don't know. I mean...

15      Q.       I mean, you've talked about  
16      more than one already today, so --

17      A.       Yeah, it was multiple -- it was  
18      multiple times. It's not -- it's not an  
19      uncommon thing.

20      Q.       For -- for you to do?

21      A.       Yes.

22      Q.       And to be done in your field?

23      A.       Correct.

24      Q.       Okay. You were asked a kind of  
25      general question earlier in the deposition,

1       very early in the deposition, about whether  
2       it's important to understand the purpose of a  
3       model, and you said it was important because  
4       it's the foundation of what you were doing.

5                   I want to talk about that with  
6       respect to work that was done by the ATSDR.

7       A.        Okay.

8       Q.        In your opinion, would the  
9       ATSDR need to know how the mean monthly  
10      contaminant levels would be used by a health  
11      professional in order to perform their  
12      modeling?

13      A.        No.

14                  MS. SILVERSTEIN: Objection.

15      Q.        BY MS. BAUGHMAN: So when you  
16      said it was important to understand the  
17      purpose of the model, what did you mean? Did  
18      you mean understanding what --

19                  MS. SILVERSTEIN: Object to  
20      form.

21      Q.        BY MS. BAUGHMAN: -- in the  
22      context of ATSDR?

23                  MS. SILVERSTEIN: Object to  
24      form.

25                  THE WITNESS: The purpose would

1           be, okay, what are we trying -- what  
2           are we trying to get out of this  
3           model; not necessarily how it could be  
4           possibly used, but what are the  
5           results, what are we trying to get out  
6           of this --

7           Q.       BY MS. BAUGHMAN: And here --

8           A.       -- model.

9           Q.       -- that was what?

10          A.       In this particular case, they  
11          were trying to get mean monthly averages at  
12          the treatment plant.

13          Q.       Okay. Earlier today -- okay.  
14          You testified earlier today that -- I think  
15          you said something about the ATSDR are not  
16          doing a good job when modeling  
17          concentrations -- simulating concentrations  
18          when the levels were low.

19                   Do you remember that testimony?

20          A.       Yes.

21          Q.       What did you mean by that?

22          A.       It's probably best if I  
23          compare -- use the word "compared." So  
24          compared to the locations where high  
25          concentrations, the model didn't do as good

1 of a job.

2 Q. At the lower?

3 A. At the lower concentrations  
4 compared to how well it did to the locations  
5 where the concentrations were high.

6 Q. Okay. Very recently you were  
7 asked in the deposition about Dr. Clement and  
8 whether you considered him to be, I don't  
9 know, someone who's reputable in your field.

10 Do you recall that?

11 A. Yes.

12 Q. And you're familiar with  
13 Dr. Clement's work?

14 A. Yeah. We are -- we are  
15 friends.

16 Q. Does that mean do you agree  
17 with everything Dr. Clement has published --

18 A. No.

19 Q. -- in the groundwater field?

20 A. No, that does not mean that.

21 Q. And specifically with respect  
22 to Camp Lejeune, do you -- are you -- do you  
23 agree with what Dr. Clement has published?  
24 To the extent you're familiar with it.

25 A. I am aware that he has

1       written -- has written material about this  
2       particular site. It's my understanding or my  
3       opinion that he was more critical of the  
4       TechFlowMP modeling approach than he was with  
5       the MODFLOW MT3D --

6           Q.        Okay.

7           A.        -- approach.

8           Q.        When you said that you consider  
9       him to be authoritative, that didn't mean you  
10      agreed with his opinions --

11       A.        No, that does not mean --

12       Q.        -- regarding Camp Lejeune?

13       A.        Correct.

14       Q.        Okay. And, similarly, you --  
15      you talked about whether various textbooks  
16      and published books are -- I think the word  
17      was used "reliable" -- does that mean you  
18      agree with all of the opinions and statements  
19      in each of those books?

20       A.        It would be hard to agree with  
21      all of the opinions and statements because  
22      you would have to go through page by page of  
23      all those textbooks.

24       Q.        And you didn't do that --

25       A.        No.

1           Q.       -- in order to answer those  
2 questions?

3           A.       No.

4           MS. BAUGHMAN: All right. I'll  
5 pass the witness.

6           MS. SILVERSTEIN: I just have a  
7 couple more questions.

8           THE WITNESS: Sure.

9                   EXAMINATION

10          BY MS. SILVERSTEIN:

11          Q.       You said that the groundwater  
12 modeling projects that were not listed on  
13 your CV, some of those included hindcasting  
14 work; right?

15          A.       Yes.

16          Q.       How many times in the projects  
17 that you -- all of the groundwater modeling  
18 projects that you've worked on, how many  
19 times have you estimated the absolute  
20 contaminant concentration to determine a  
21 specific person's exposure level?

22            MS. BAUGHMAN: Objection.

23            Form. Foundation. It's outside the  
24 scope of his job to do that.

25            THE WITNESS: Yeah, I -- I

1           would say -- you're asking me how the  
2           model may have been used, and I don't  
3           know the answer to that.

4           Q.        BY MS. SILVERSTEIN: So you're  
5           not aware of any times that the -- any  
6           instances in which the model -- modeling that  
7           you've done has been used to determine the  
8           exposure for a specific person; is that  
9           right?

10           MS. BAUGHMAN: Objection. Form  
11           and foundation.

12           THE WITNESS: I'm not saying  
13           that it's not possible. I'm not aware  
14           of it.

15           MS. SILVERSTEIN: Okay. I have  
16           no more questions.

17           MS. BAUGHMAN: Okay. We're  
18           finished.

19           THE WITNESS: Okay.

20           THE VIDEOGRAPHER: We're off  
21           the record. The time is 5:44.

22           (The deposition was concluded at 5:44 p.m.)

23           -000-

## Reporter's Certificate

State of Utah )

County of Salt Lake )

I, Vickie Larsen, Certified Court Reporter and Registered Merit Reporter in the State of Utah, do hereby certify:

THAT the foregoing proceedings were taken before me at the time and place set forth herein; that the witness was duly sworn to tell the truth, the whole truth, and nothing but the truth; and that the proceedings were taken down by me in shorthand and thereafter transcribed into typewriting under my direction and supervision;

THAT the foregoing pages contain a true  
and correct transcription of my said  
shorthand notes so taken.

IN WITNESS WHEREOF, I have subscribed  
my name this 18th day of February, 2025.

*Vickie Yansen*

Vickie Larsen, CCR/RMR

Utah License No. 109887-7801

Nevada License No. 966

1 In Re: Camp Lejeune Water Litigation  
Case No.: 7:23-CV-00897  
2 Date: February 13, 2025  
Reporter: Vickie Larsen, CCR/RMR

**WITNESS CERTIFICATE**

State of Utah )  
ss.  
County of Salt Lake )

I, R. JEFFREY DAVIS, HEREBY DECLARE:  
That I am the witness referred to in the foregoing testimony; that I have read the transcript and know the contents thereof; that with these corrections I have noted this transcript truly and accurately reflects my testimony.

PAGE-LINE	CHANGE / CORRECTION	REASON
10		
11	-----	-----
12	-----	-----
13	-----	-----
14	-----	-----
15	-----	-----
16	-----	-----
17	-----	-----
18	-----	-----
19	-----	No corrections were made.

I, R. JEFFREY DAVIS, hereby declare under the penalties of perjury of the laws of the United States of America and the laws of the State of Utah that the foregoing is true and correct.

Dated this \_\_\_\_\_ day of \_\_\_\_\_,  
2025.

R. JEFFREY DAVIS

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